Measurements

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2024-03-15

R Markdown

```
library(tidyverse);
```

```
## -- Attaching core tidyverse packages ------------------------ tidyverse 2.0.0 --
## v dplyr     1.1.4     v readr     2.1.5
## v forcats   1.0.0     v stringr   1.5.1
## v ggplot2   3.5.0     v tibble    3.2.1
## v lubridate 1.9.3     v tidyr     1.3.1
## v purrr     1.0.2
## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
## i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors
```

```
library(ggthemes);
```

```
## Warning: package 'ggthemes' was built under R version 4.3.3
```

```
library(svglite)
```

```
## Warning: package 'svglite' was built under R version 4.3.3
```

```
theme_set(theme_solarized_2(light = TRUE));
```

```
dat_raw <- read_tsv("raw.tsv");
```

```
## Rows: 200000 Columns: 4
## -- Column specification --------------------------------------------------------
## Delimiter: "\t"
## chr (2): term, machine
## dbl (2): duration_ns, supported
##
## i Use `spec()` to retrieve the full column specification for this data.
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
dat_raw$term <- as.factor(dat_raw$term);
dat_raw$machine <- as.factor(dat_raw$machine)
dat_raw$supported <- as.logical(dat_raw$supported);
```

```
message("Raw data");
```

```
## Raw data
```

```
dat_raw |> summary(maxsum = max(lengths(lapply(dat_raw, unique))))
```

```
##                term        duration_ns       supported          machine
##  Alacritty      :10000   Min.   :   14780   Mode :logical   linux  :150000
##  cool-retro-term:10000   1st Qu.:   33870   FALSE:50000     macbook: 50000
##  Fleet          :10000   Median :   47210   TRUE :150000
##  foot           :10000   Mean   : 5119864
##  Hyper          :10000   3rd Qu.: 3127897
##  IntelliJ IDEA  :10000   Max.   :66497255
##  iTerm2         :10000
##  kitty          :10000
##  Konsole        :10000
##  linux          :10000
##  QMLKonsole     :10000
##  QTerminal      :10000
##  Rio            :10000
##  rxvt-unicode   :10000
##  Terminal.app   :10000
##  Terminology    :10000
##  VSCode         :10000
##  vte            :10000
##  WezTerm        :10000
##  xterm          :10000
```

```
dat_raw |>
  group_by(term) |>
  summarise(
    "mean [ns]" = mean(duration_ns),
    "median [ns]" = median(duration_ns),
    "sd [ns]" = sd(duration_ns),
  );
```

```
## # A tibble: 20 x 4
##    term            `mean [ns]` `median [ns]` `sd [ns]`
##    <fct>                 <dbl>         <dbl>     <dbl>
##  1 Alacritty            42432.        40850      9674.
##  2 cool-retro-term      27979.        26000     27409.
##  3 Fleet               174927.       153867    138655.
##  4 foot                 26503.        25470      5213.
##  5 Hyper             19882799.     19193872.  2115313.
##  6 IntelliJ IDEA       189057.       156962.   326382.
##  7 iTerm2            28313153.     26136492. 13391226.
##  8 kitty              3130178.      3116217     62839.
##  9 Konsole              36116.        34250     40187.
## 10 linux                16529.        15950      2364.
## 11 QMLKonsole           43923.        44710.    28874.
## 12 QTerminal            27528.        25820     22022.
## 13 Rio                  57857.        51490     57525.
## 14 rxvt-unicode         29444.        26340     14804.
## 15 Terminal.app        221179.       203528.   104151.
## 16 Terminology          38655.        37880      6371.
## 17 VSCode            26144749.     26108426.  1366196.
## 18 vte               20674549.     15181479   9530651.
## 19 WezTerm            3280992.      3138927    268035.
## 20 xterm                38733.        38770      5977.
```

```r
message("Filtered data");
```

```
## Filtered data
```

```r
alpha <- 0.05;
dat <- dat_raw |>
  filter(duration_ns > quantile(duration_ns, alpha / 2) & duration_ns < quantile(duration_ns, 1 - alpha
  mutate(duration_us = duration_ns / 1000) |>
  select(-duration_ns);

dat$machine <- dat$machine |>
  recode(
    "linux" = "Linux Desktop",
    "macbook" = "MacBook Pro"
  );


dat |> summary(maxsum = max(lengths(lapply(dat, unique))));
```

```
##                term       supported                machine
##  Alacritty      :10000   Mode :logical   Linux Desktop:143176
##  cool-retro-term:10000   FALSE:44758     MacBook Pro  : 46582
##  Fleet          :10000   TRUE :145000
##  foot           :10000
##  Hyper          : 9997
##  IntelliJ IDEA  :10000
##  iTerm2         : 6585
##  kitty          :10000
##  Konsole        :10000
##  linux          : 4758
##  QMLKonsole     :10000
##  QTerminal      :10000
##  Rio            :10000
##  rxvt-unicode   :10000
##  Terminal.app   :10000
##  Terminology    :10000
##  VSCode         : 9847
##  vte            : 8571
##  WezTerm        :10000
##  xterm          :10000
##   duration_us
##  Min.   :   15.95
##  1st Qu.:   34.19
##  Median :   47.31
##  Mean   : 4337.47
##  3rd Qu.: 3122.92
##  Max.   :30877.65
##
##
##
##
##
##
##
```

```
##
##
##
##
##
##
##
```

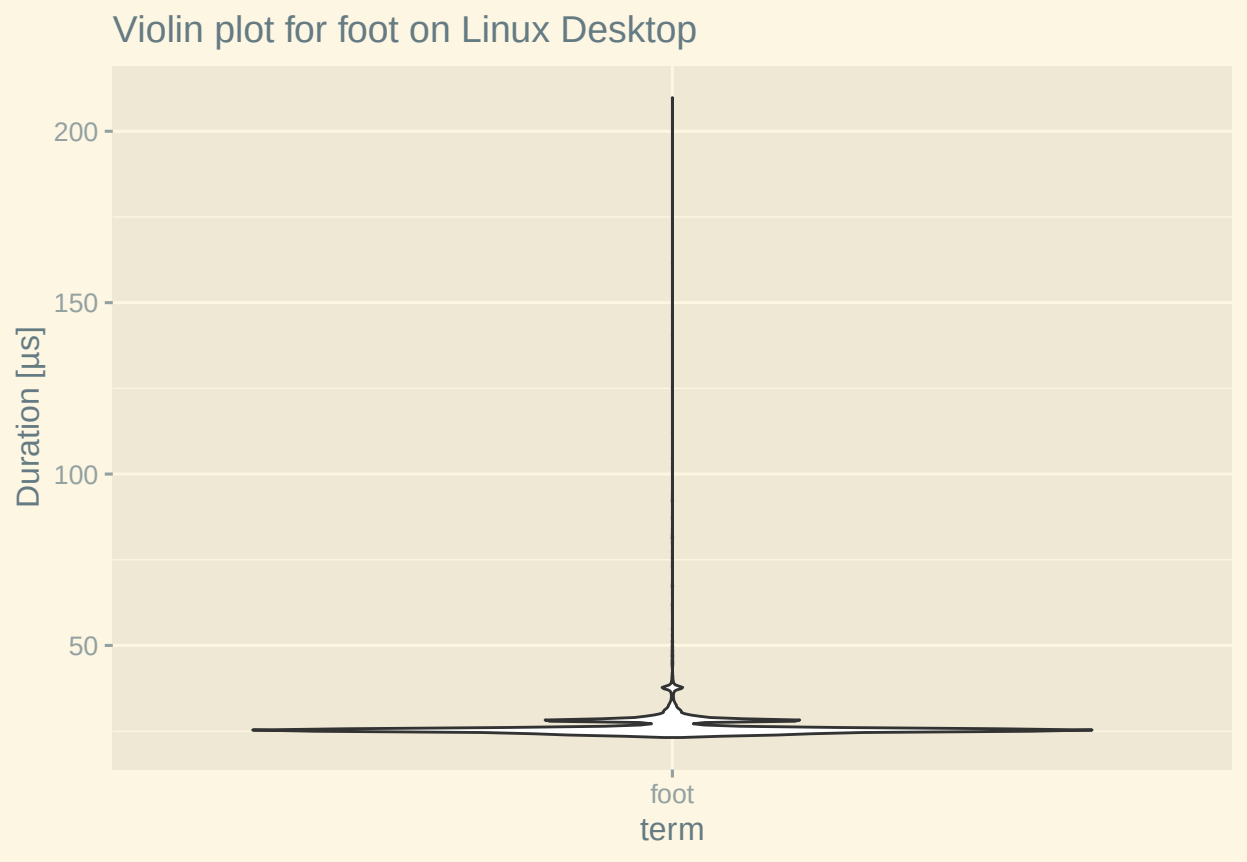
```
dat |>
  group_by(term) |>
  summarise(
    "mean [s]" = mean(duration_us),
    "median [s]" = median(duration_us),
    "sd [s]" = sd(duration_us),
  );
```

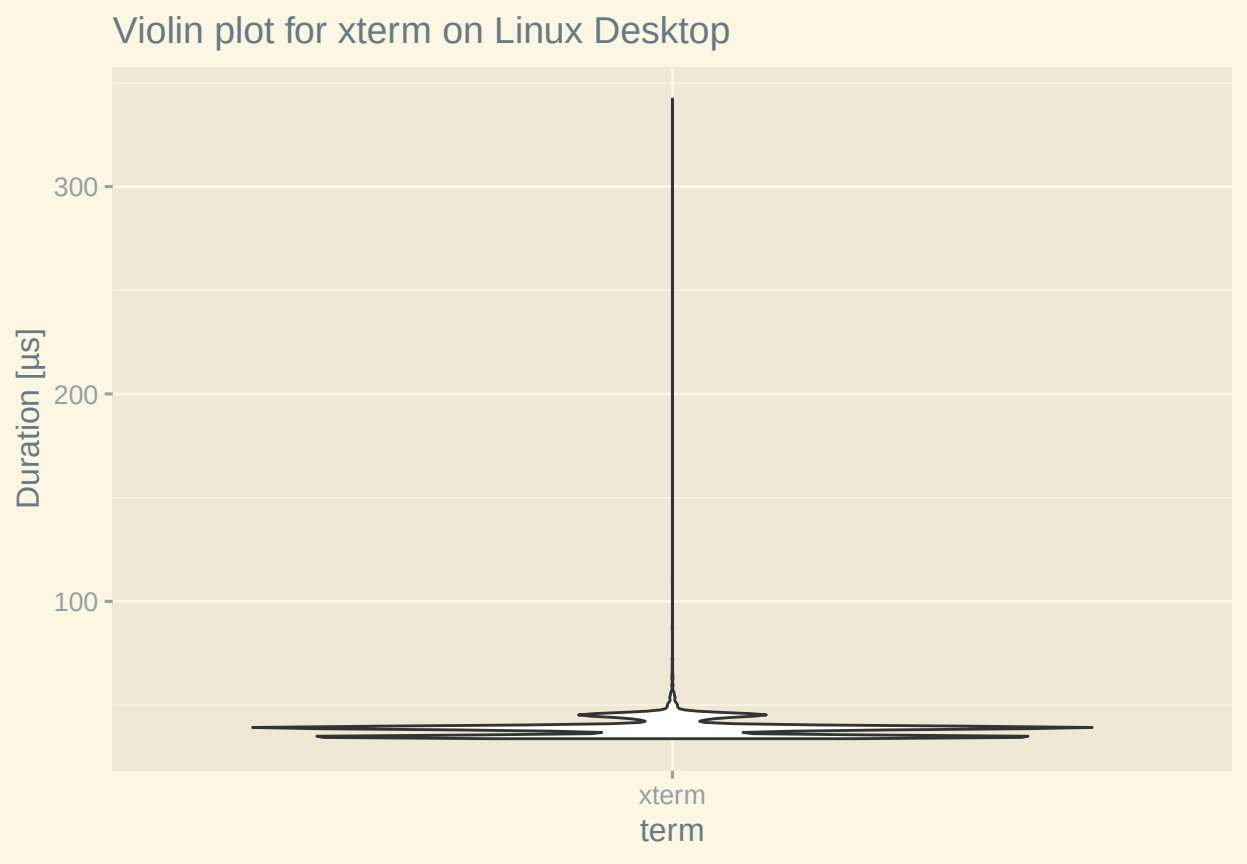
```
## # A tibble: 20 x 4
##    term            `mean [s]` `median [s]` `sd [s]`
##    <fct>                <dbl>         <dbl>     <dbl>
##  1 Alacritty             42.4          40.8      9.67
##  2 cool-retro-term       28.0          26       27.4
##  3 Fleet                175.          154.     139.
##  4 foot                  26.5          25.5      5.21
##  5 Hyper              19878.        19193.    2099.
##  6 IntelliJ IDEA        189.          157.     326.
##  7 iTerm2             20403.        17665.    5494.
##  8 kitty               3130.         3116.      62.8
##  9 Konsole               36.1          34.2     40.2
## 10 linux                 17.4          16.2      3.18
## 11 QMLKonsole            43.9          44.7     28.9
## 12 QTerminal             27.5          25.8     22.0
## 13 Rio                   57.9          51.5     57.5
## 14 rxvt-unicode          29.4          26.3     14.8
## 15 Terminal.app         221.          204.     104.
## 16 Terminology           38.7          37.9      6.37
## 17 VSCode             26010.        26105.     620.
## 18 vte                18683.        15152.    8661.
## 19 WezTerm             3281.         3139.     268.
## 20 xterm                 38.7          38.8      5.98
```

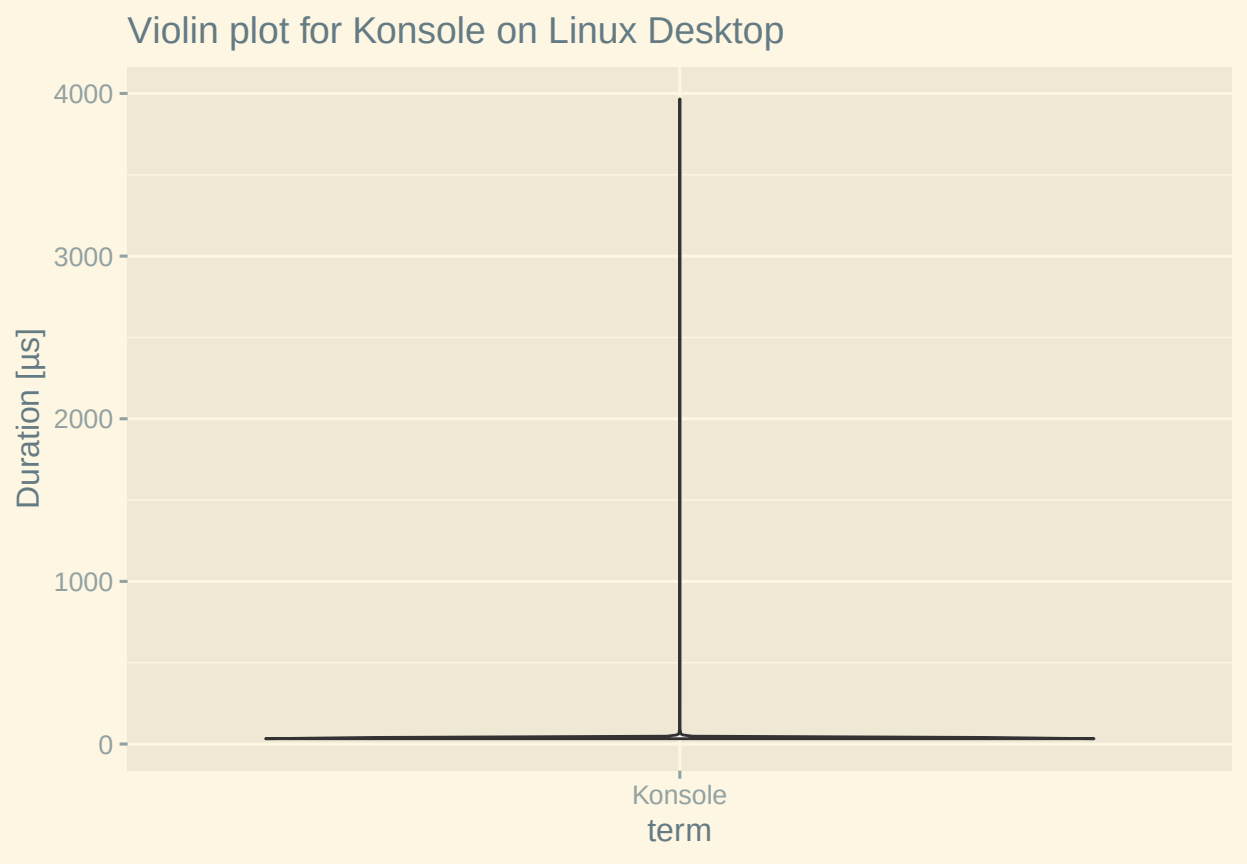
Violin plots

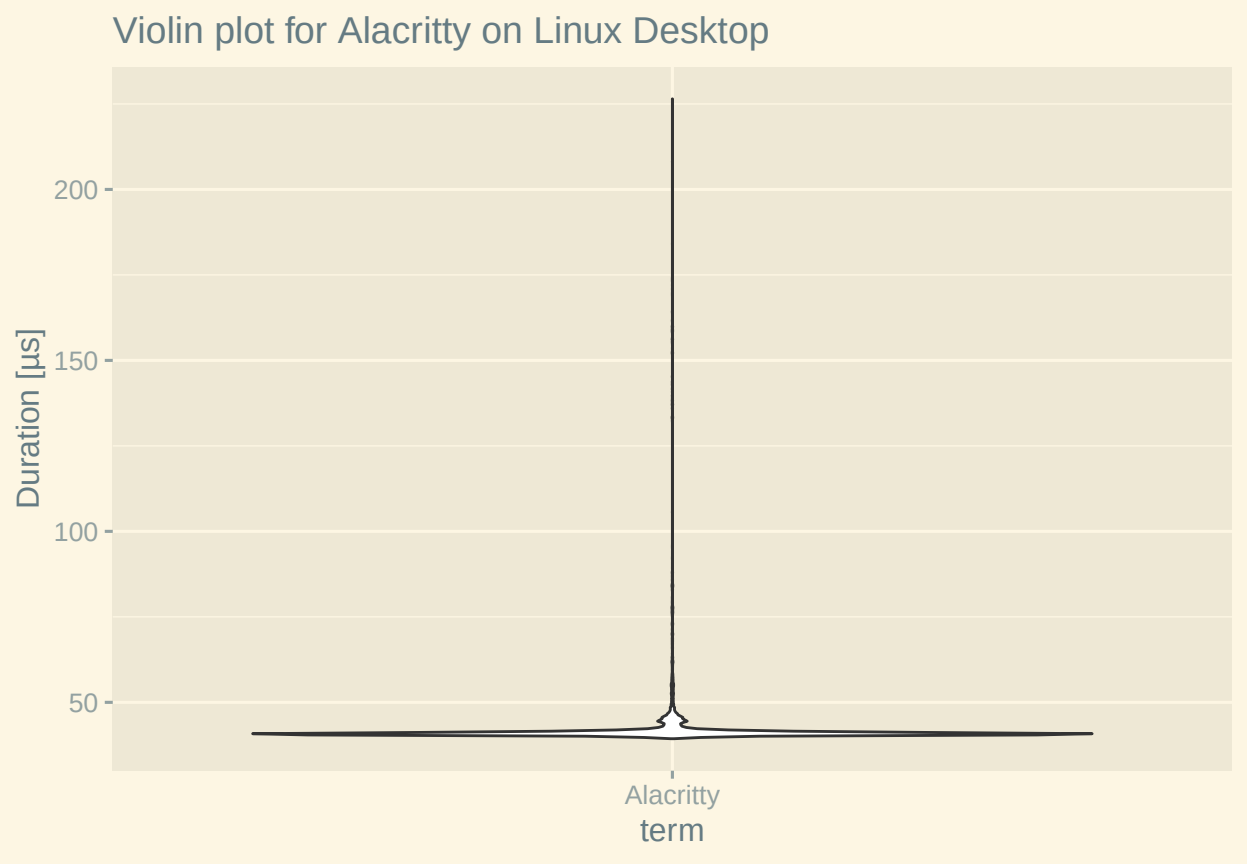
```
for (current_term in unique(dat$term)) {
  machine <- dat |>
    filter(term == current_term) |>
    pull(machine) |>
    unique();
  plt <- dat |>
    filter(term == current_term) |>
    ggplot(aes(x = term, y = duration_us)) +
    geom_violin() +
    ggtitle(glue::glue("Violin plot for {current_term} on {machine}")) +
    ylab("Duration [s]");
  print(plt);
```

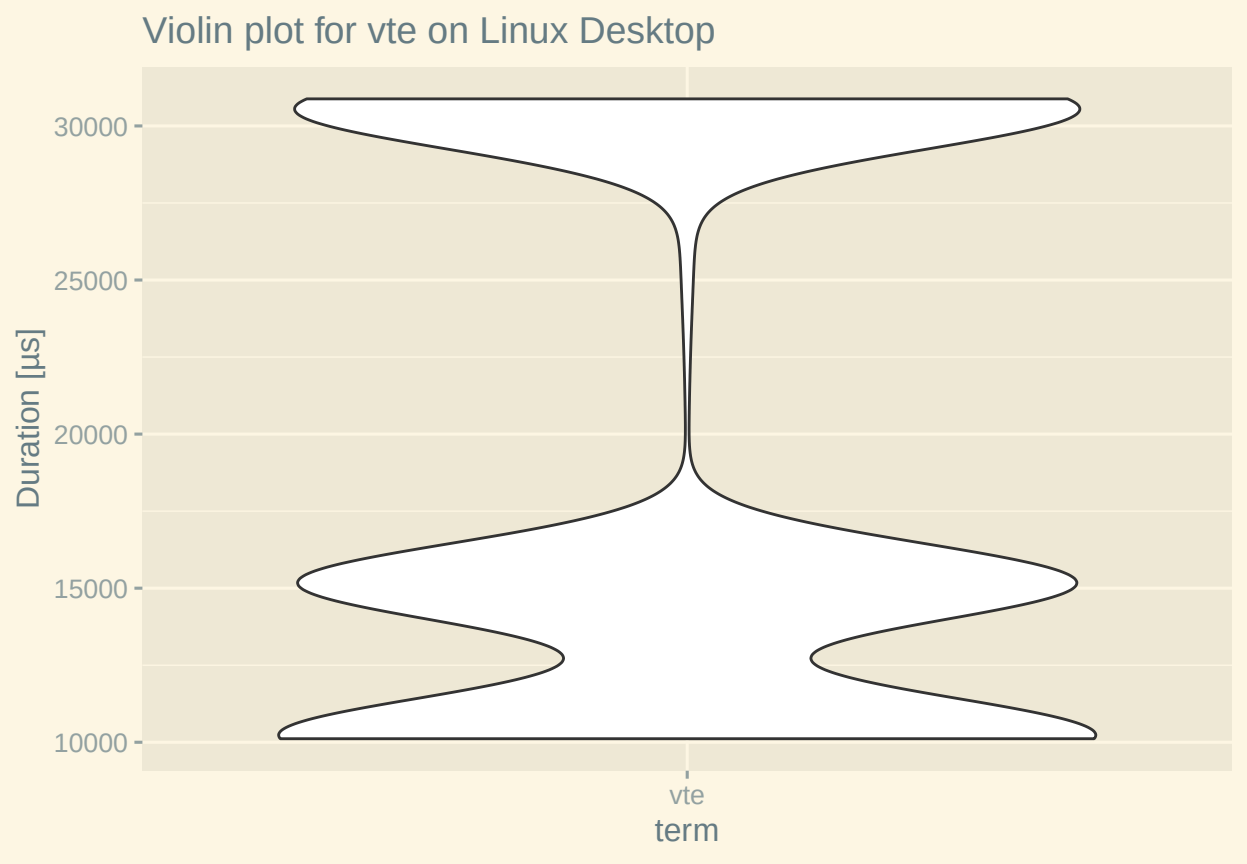
```
}
```

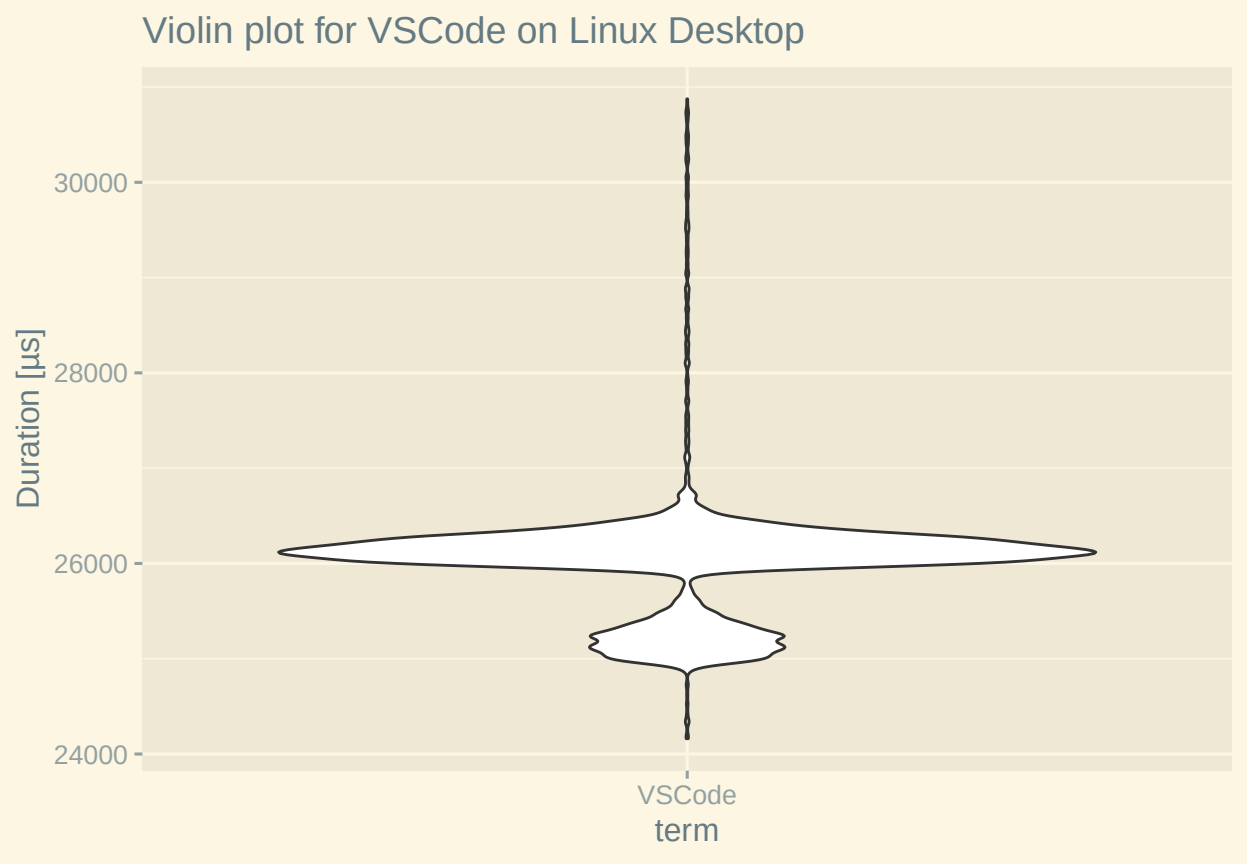

Violin plot for foot on Linux Desktop
200
150
100
50
Duration [µs]
foot
term

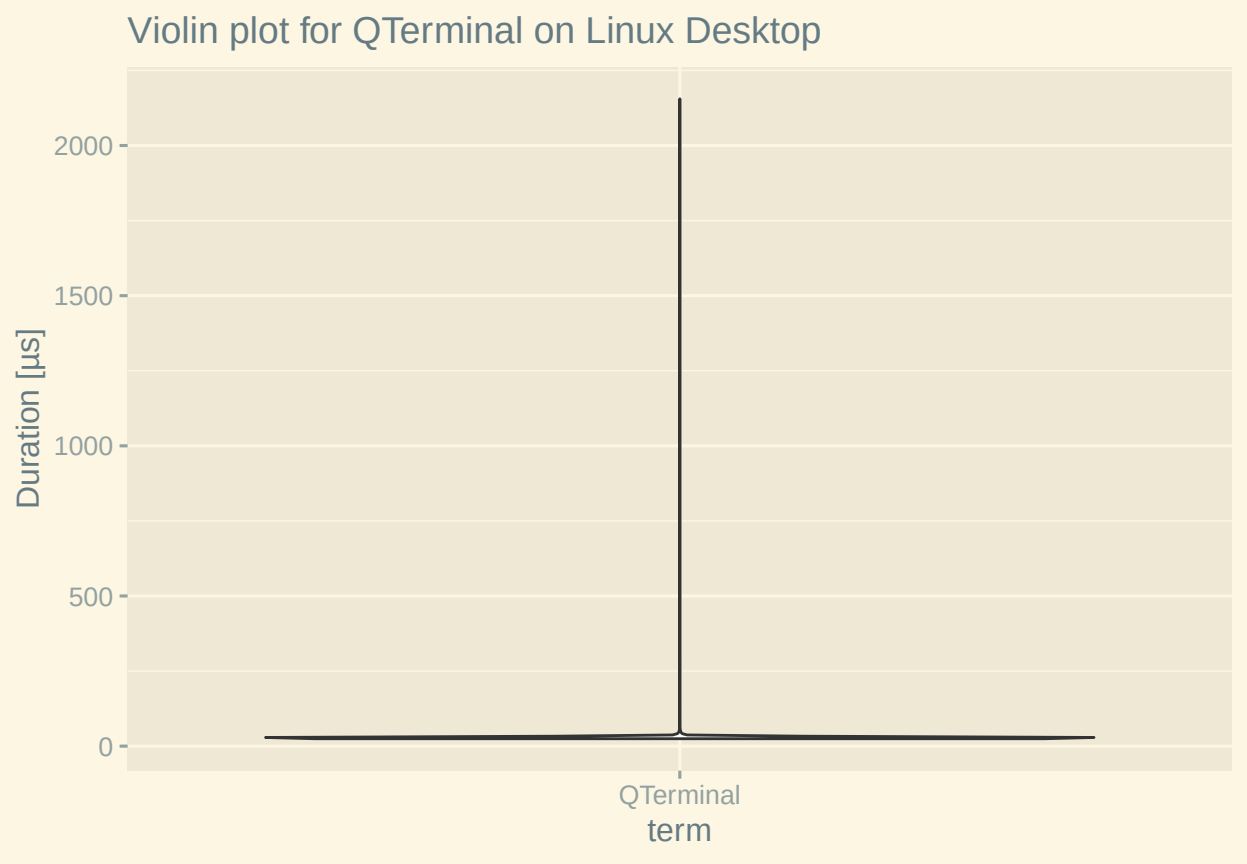

Violin plot for xterm on Linux Desktop
300
200
100
Duration [µs]
xterm
term

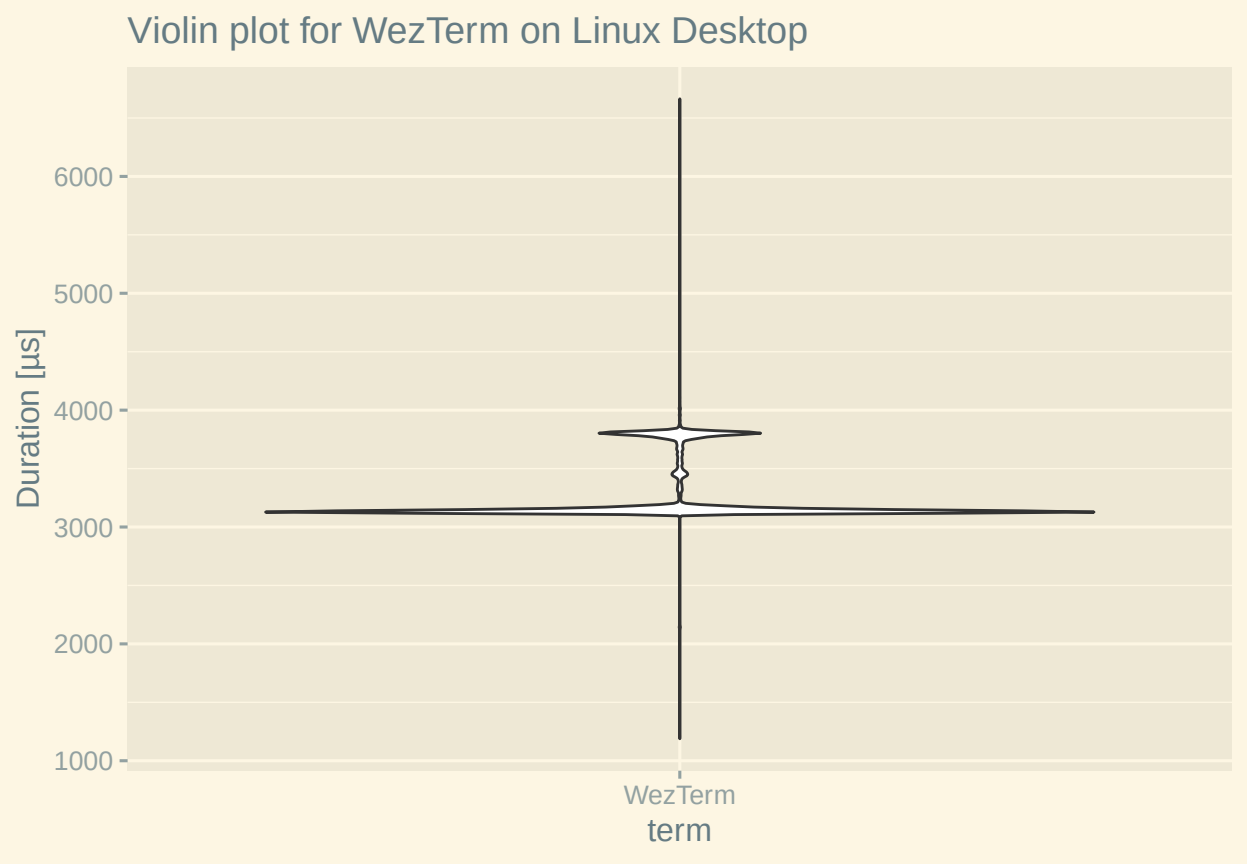

Violin plot for Konsole on Linux Desktop
4000
3000
2000
1000
0
Duration [µs]
Konsole
term

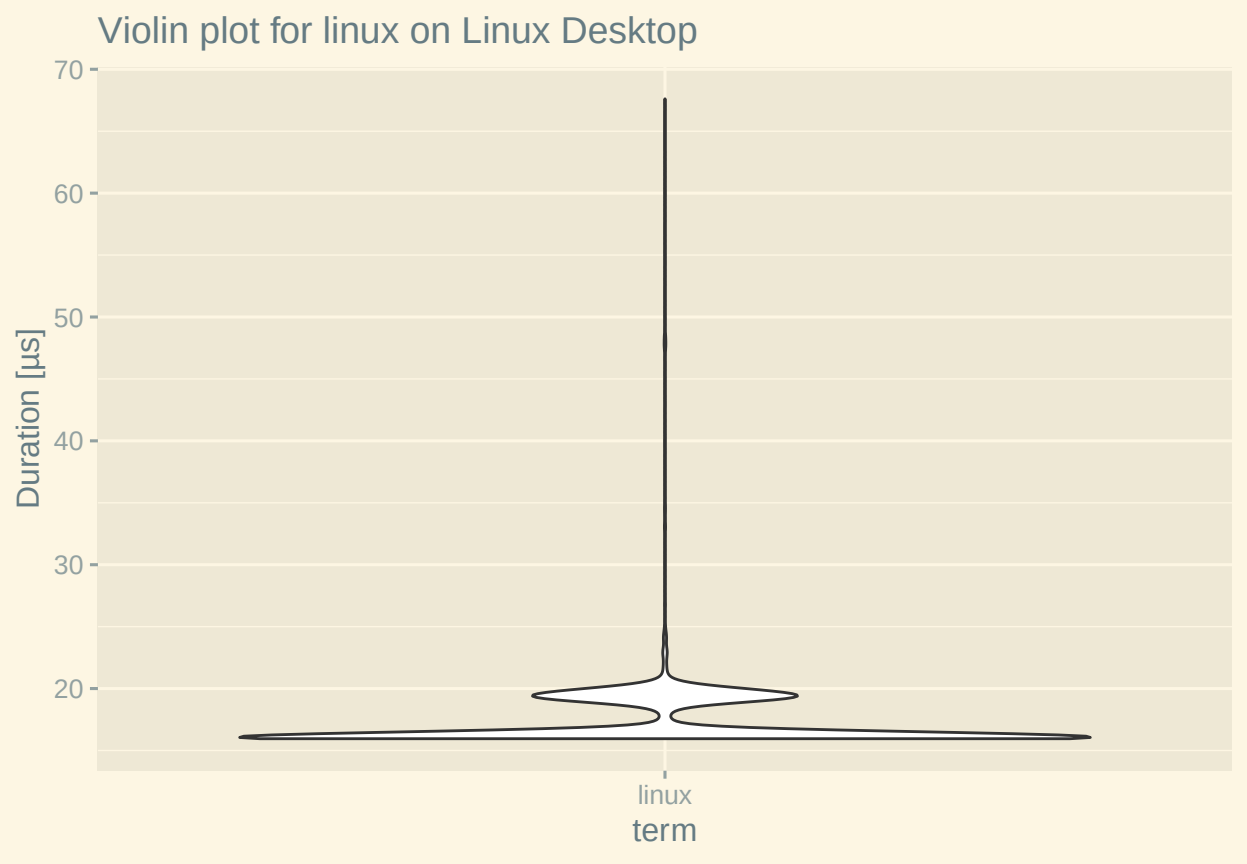

Violin plot for Alacritty on Linux Desktop
Duration [µs]
200
150
100
50
Alacritty
term

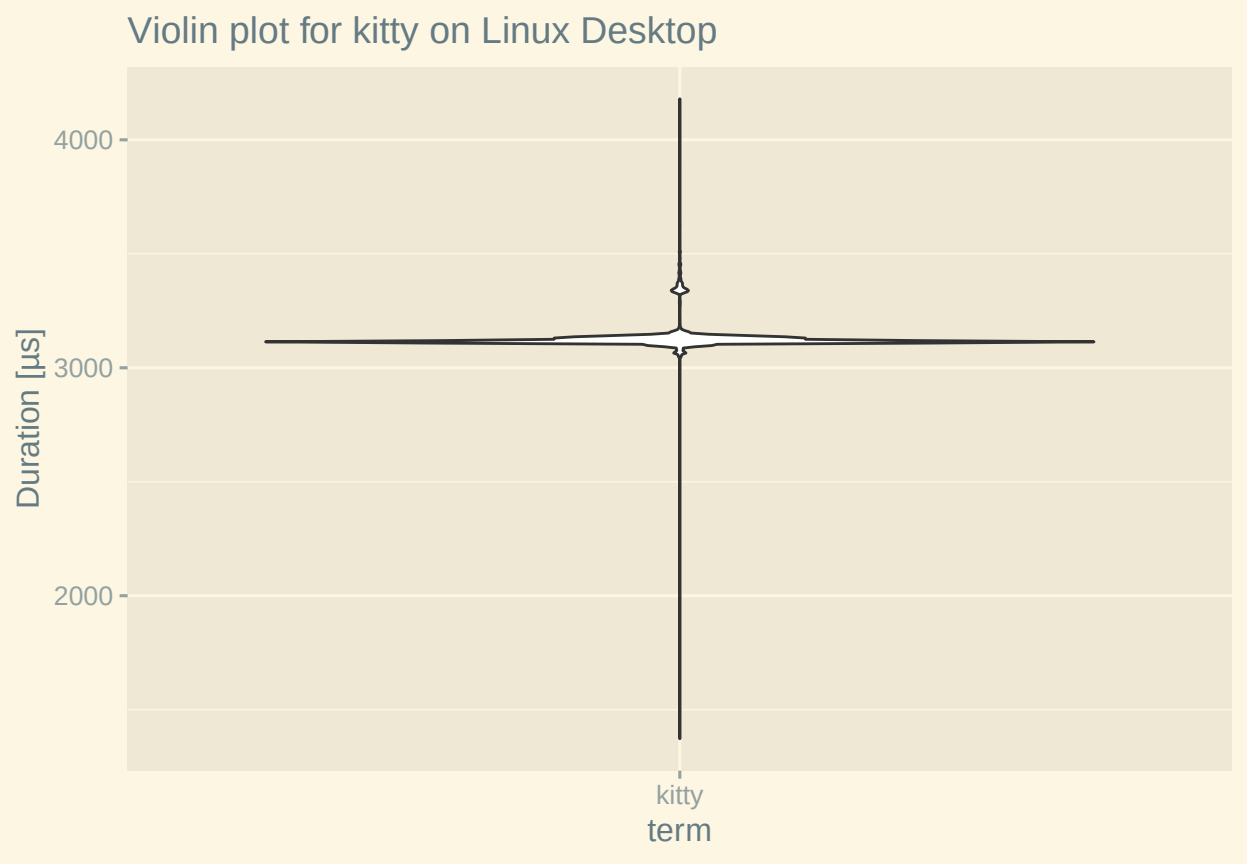

Violin plot for vte on Linux Desktop
30000
25000
20000
15000
10000
Duration [µs]
vte
term

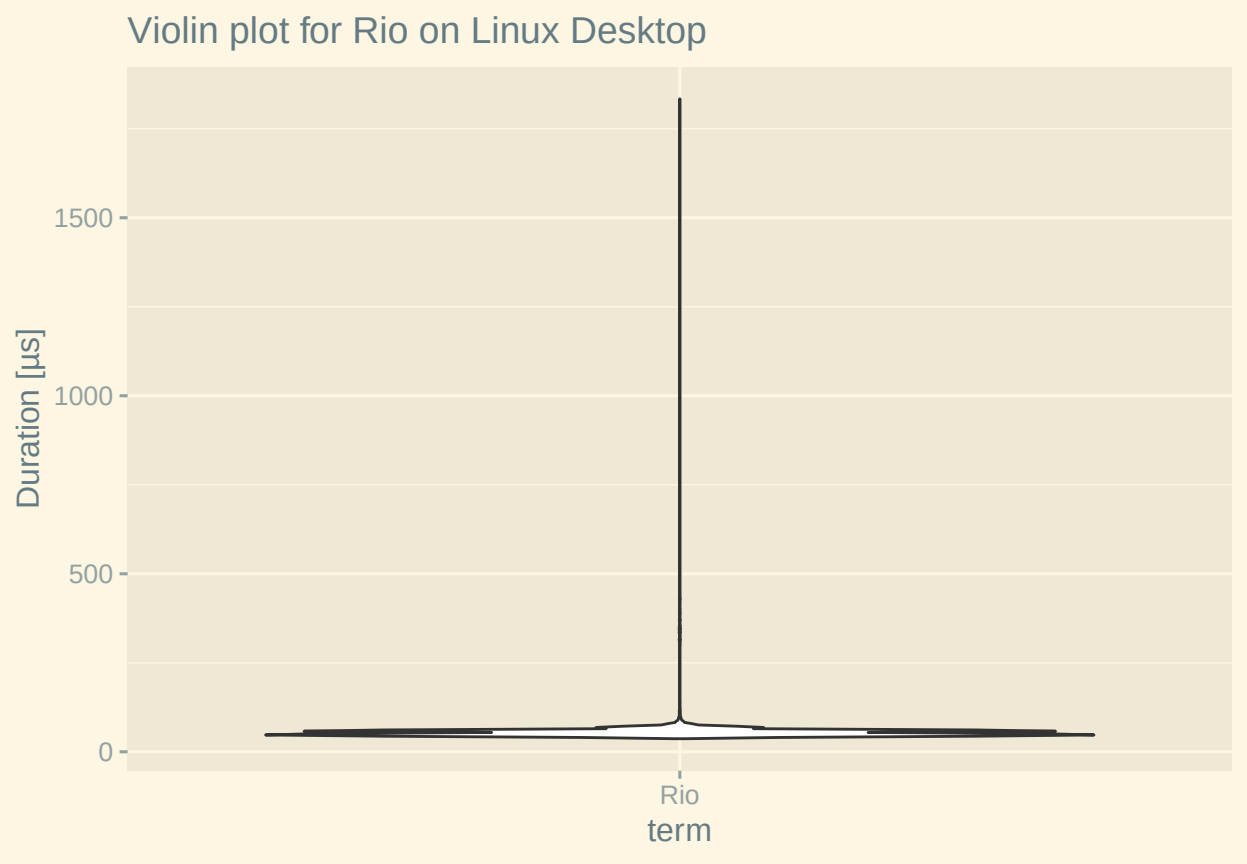

Violin plot for VSCode on Linux Desktop
Duration [µs]
30000
28000
26000
24000
VSCode
term

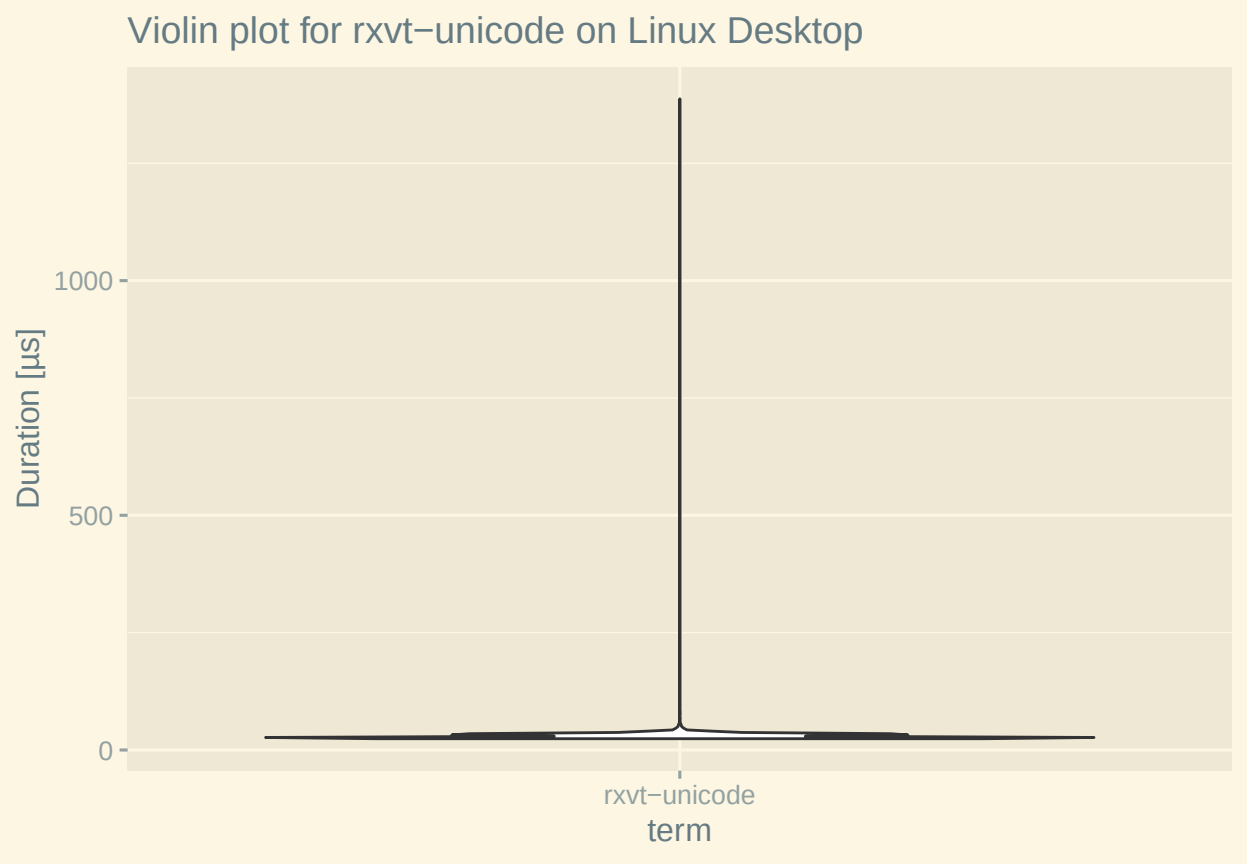

Violin plot for QTerminal on Linux Desktop
Duration [µs]
2000
1500
1000
500
0
QTerminal
term

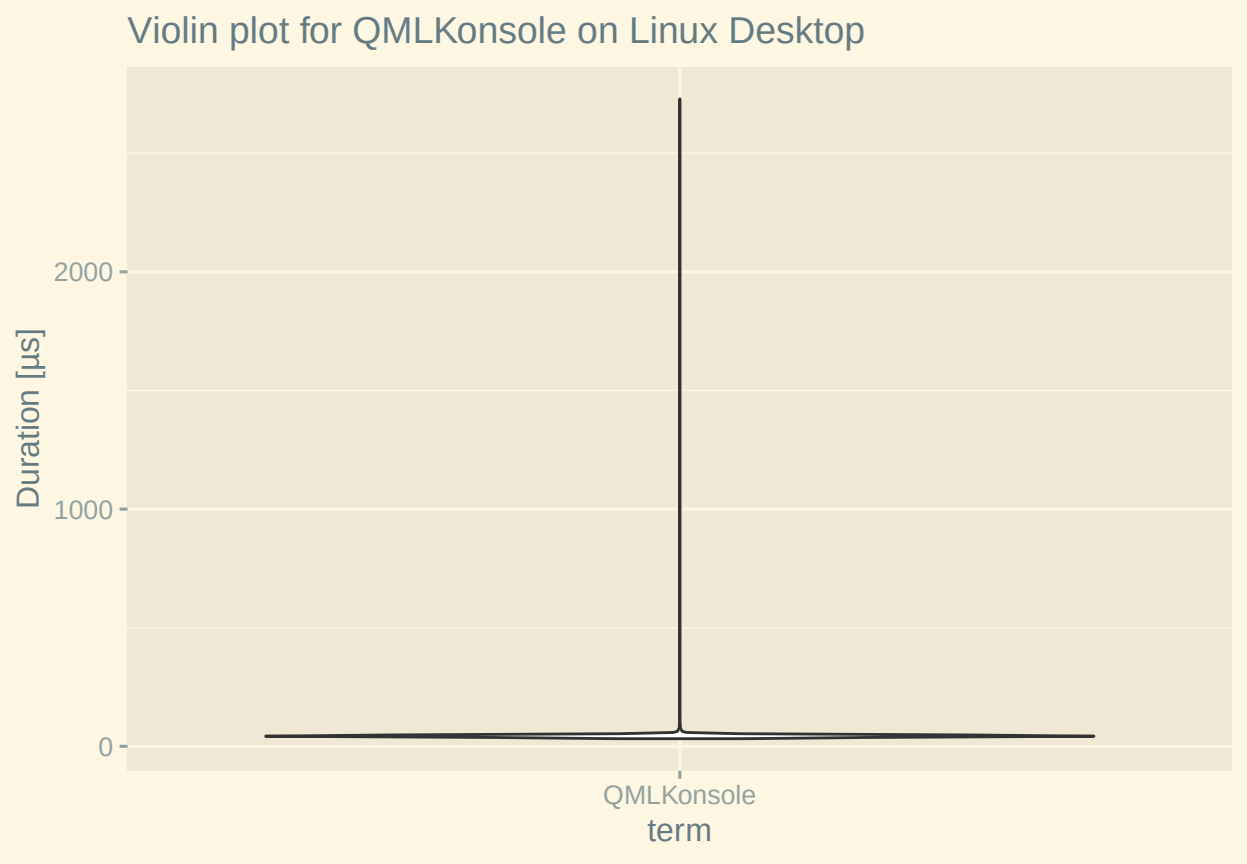

Violin plot for WezTerm on Linux Desktop
Duration [µs]
6000
5000
4000
3000
2000
1000
WezTerm
term

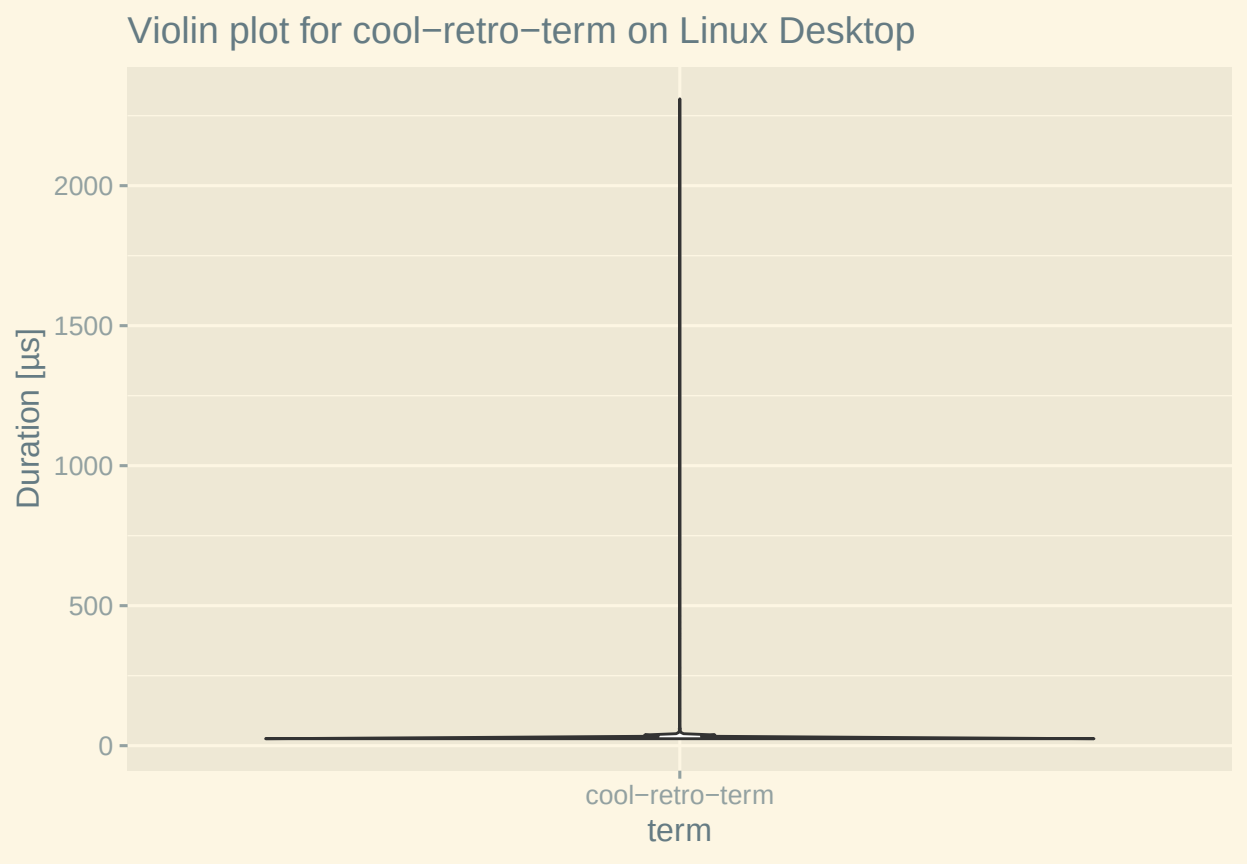

Violin plot for linux on Linux Desktop
70
60
50
40
30
20
Duration [µs]
linux
term

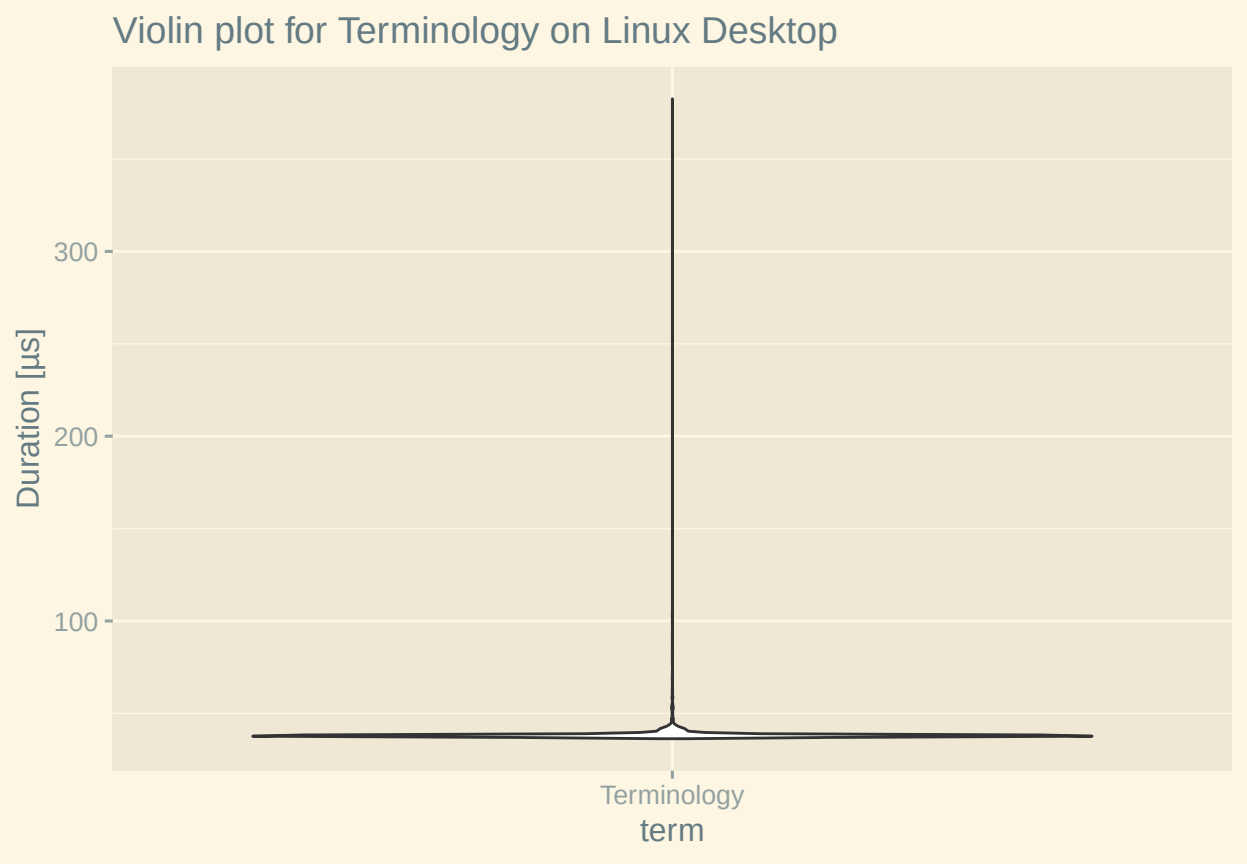

Violin plot for kitty on Linux Desktop
4000
3000
2000
Duration [µs]
kitty
term

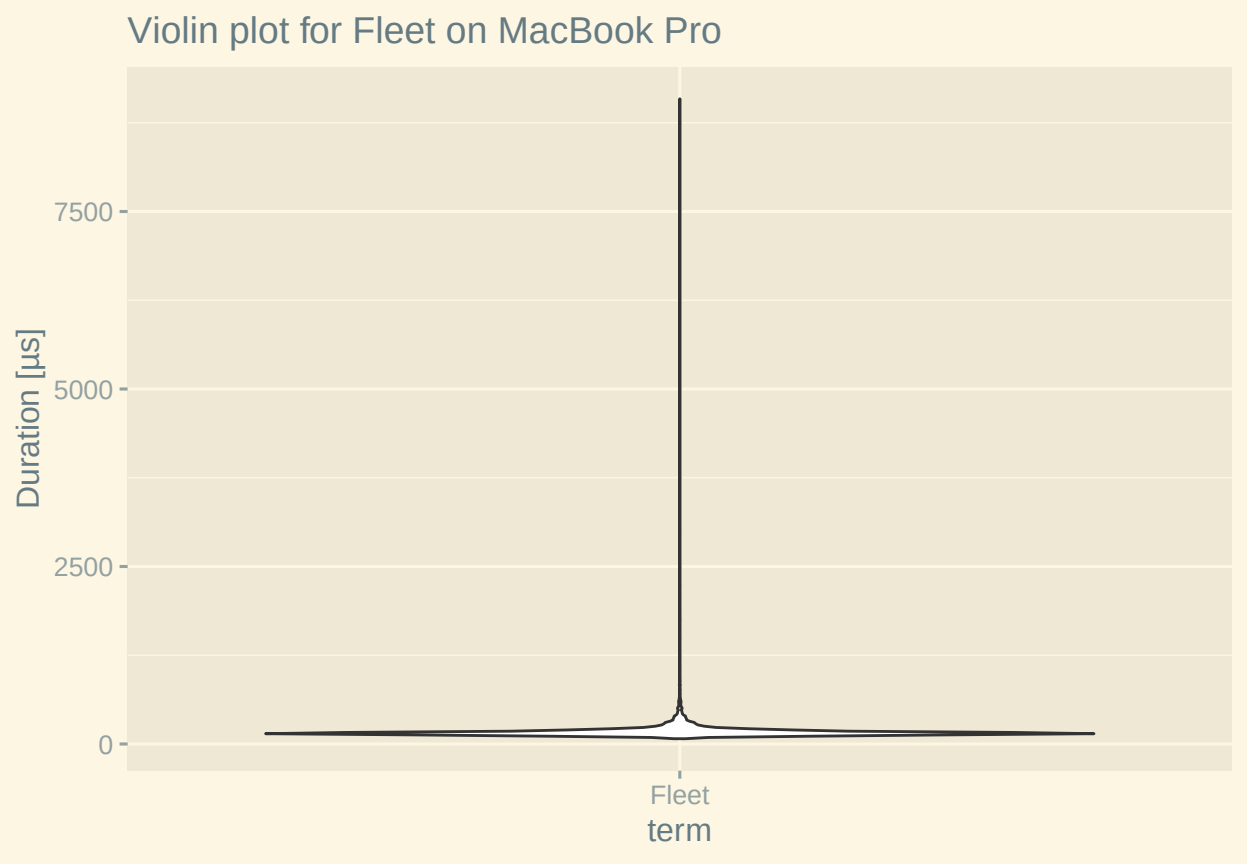

Violin plot for Rio on Linux Desktop
Duration [µs]
1500
1000
500
0
Rio
term

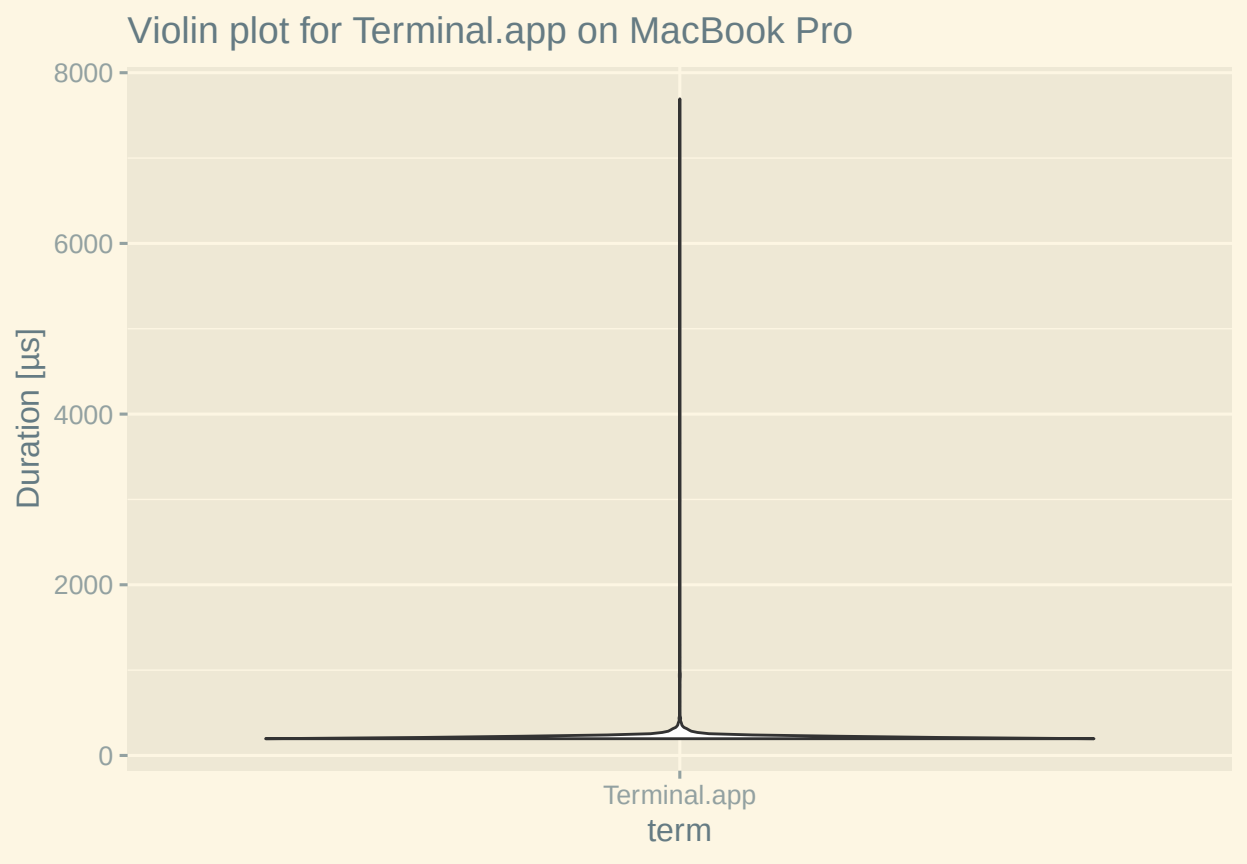

Violin plot for rxvt−unicode on Linux Desktop
Duration [µs]
1000
500
0
rxvt−unicode
term

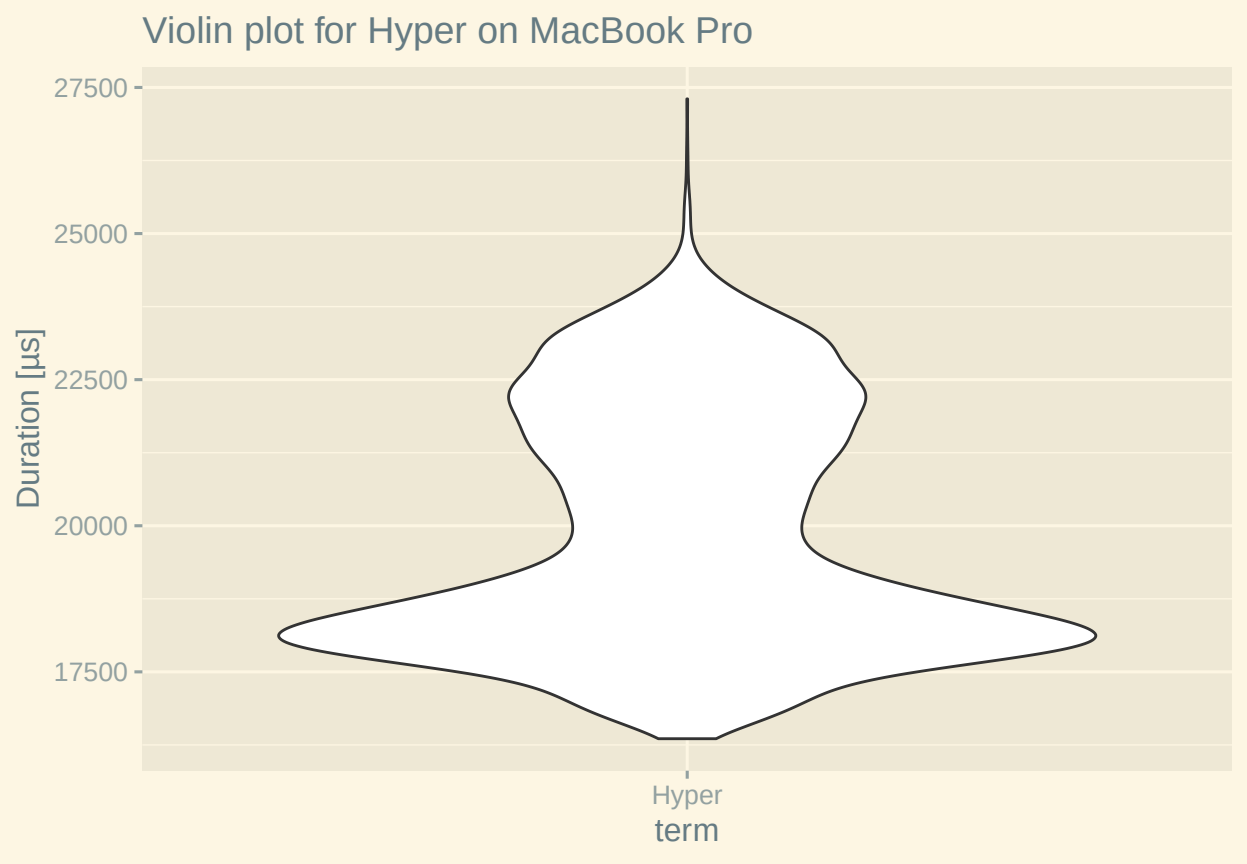

Violin plot for QMLKonsole on Linux Desktop
Duration [µs]
2000
1000
0
QMLKonsole
term

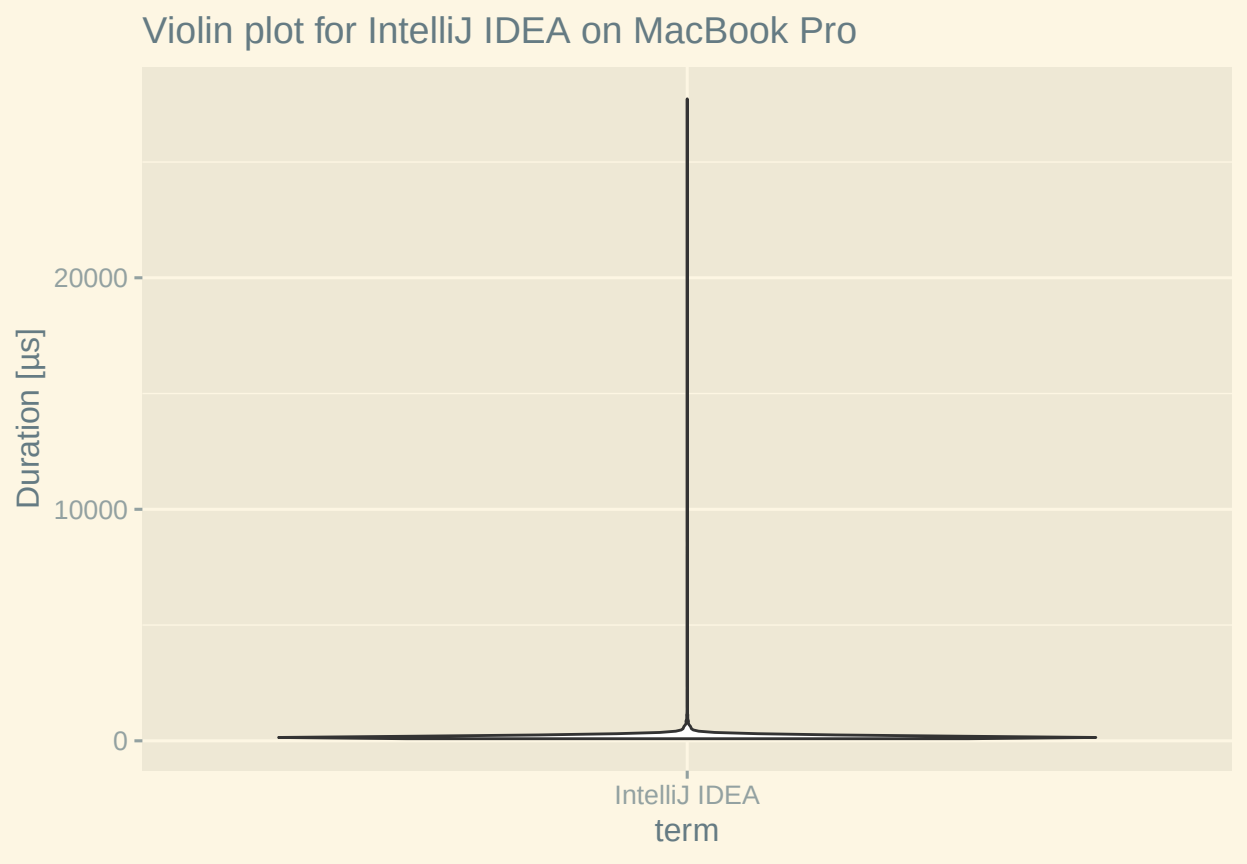

Violin plot for cool−retro−term on Linux Desktop
Duration [µs]
2000
1500
1000
500
0
cool−retro−term
term

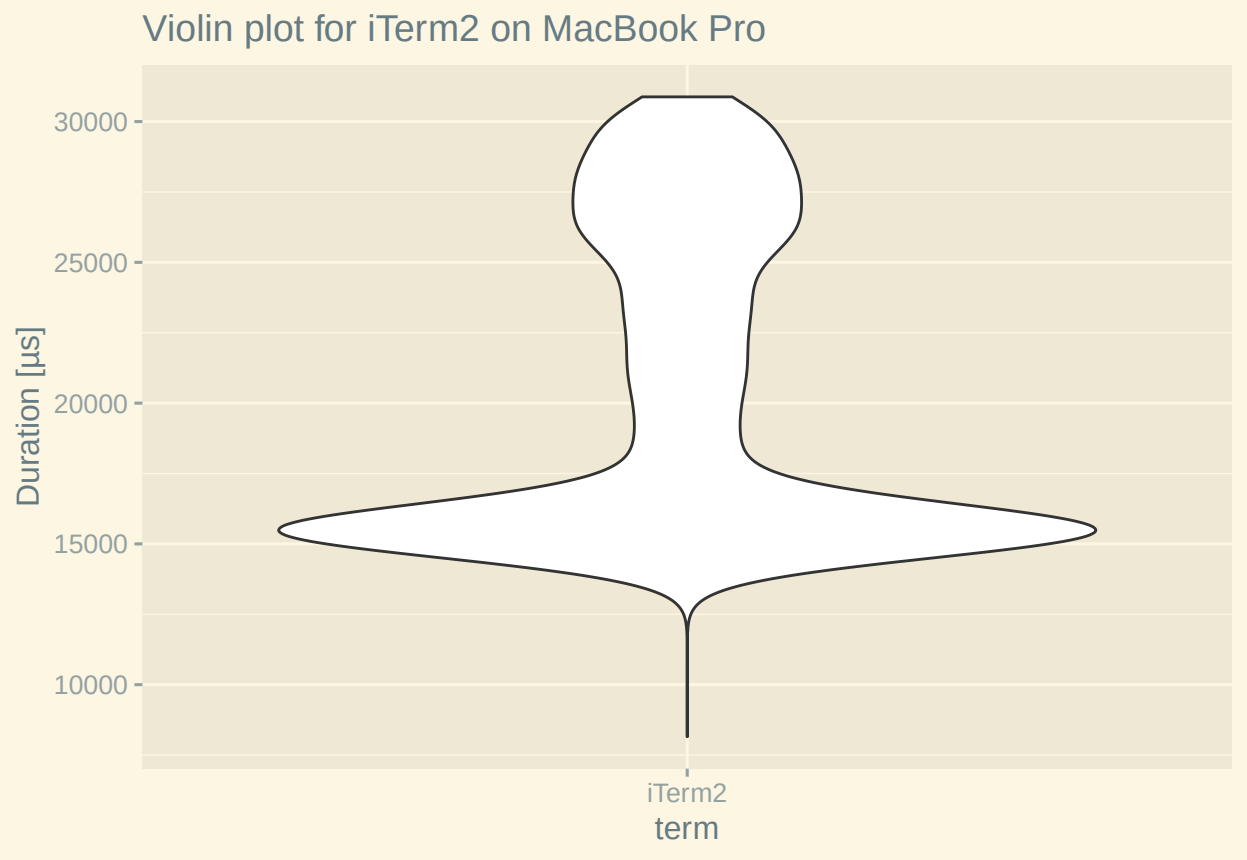

Violin plot for Terminology on Linux Desktop
Duration [µs]
300
200
100
Terminology
term


Violin plot for Fleet on MacBook Pro
Duration [µs]
7500
5000
2500
0
Fleet
term


Violin plot for Terminal.app on MacBook Pro
8000
6000
4000
2000
0
Duration [µs]
Terminal.app
term

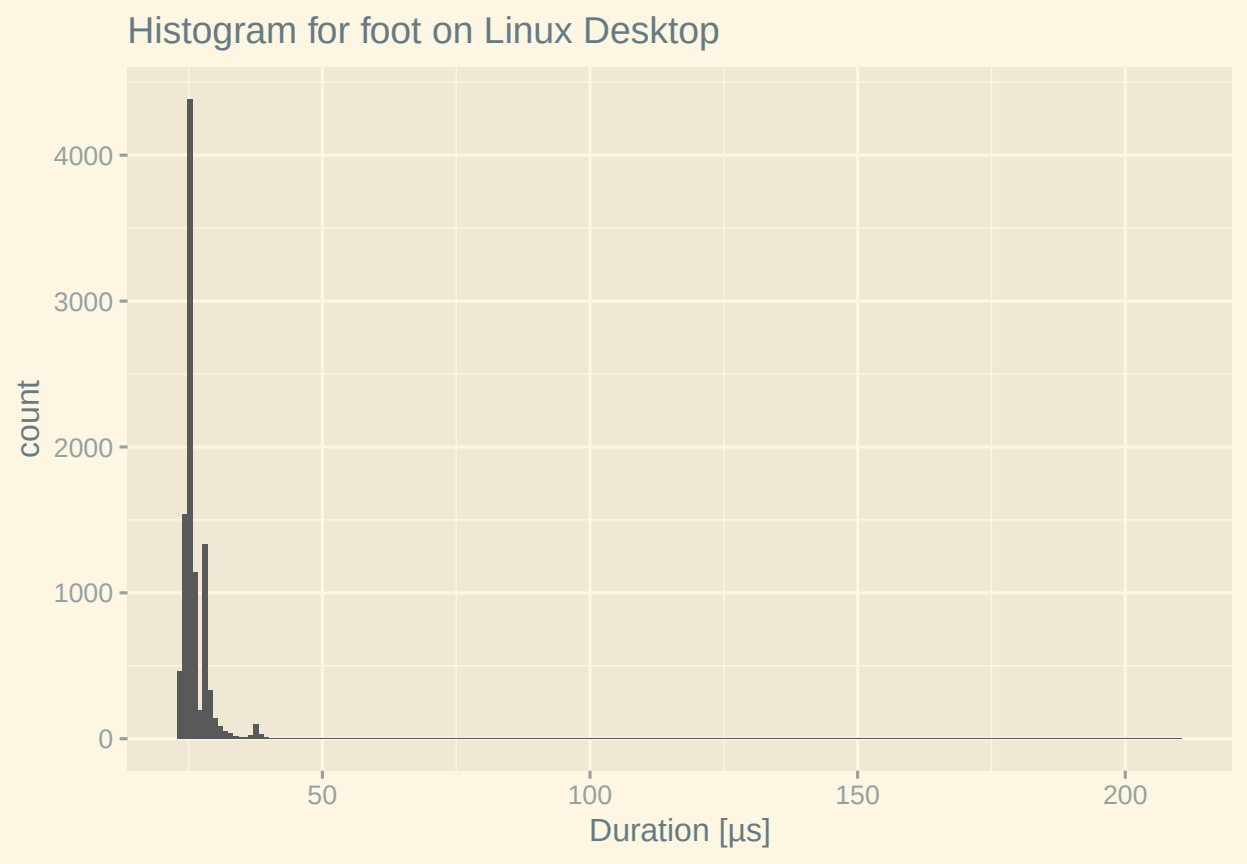

Violin plot for Hyper on MacBook Pro
27500
25000
22500
20000
17500
Duration [µs]
Hyper
term

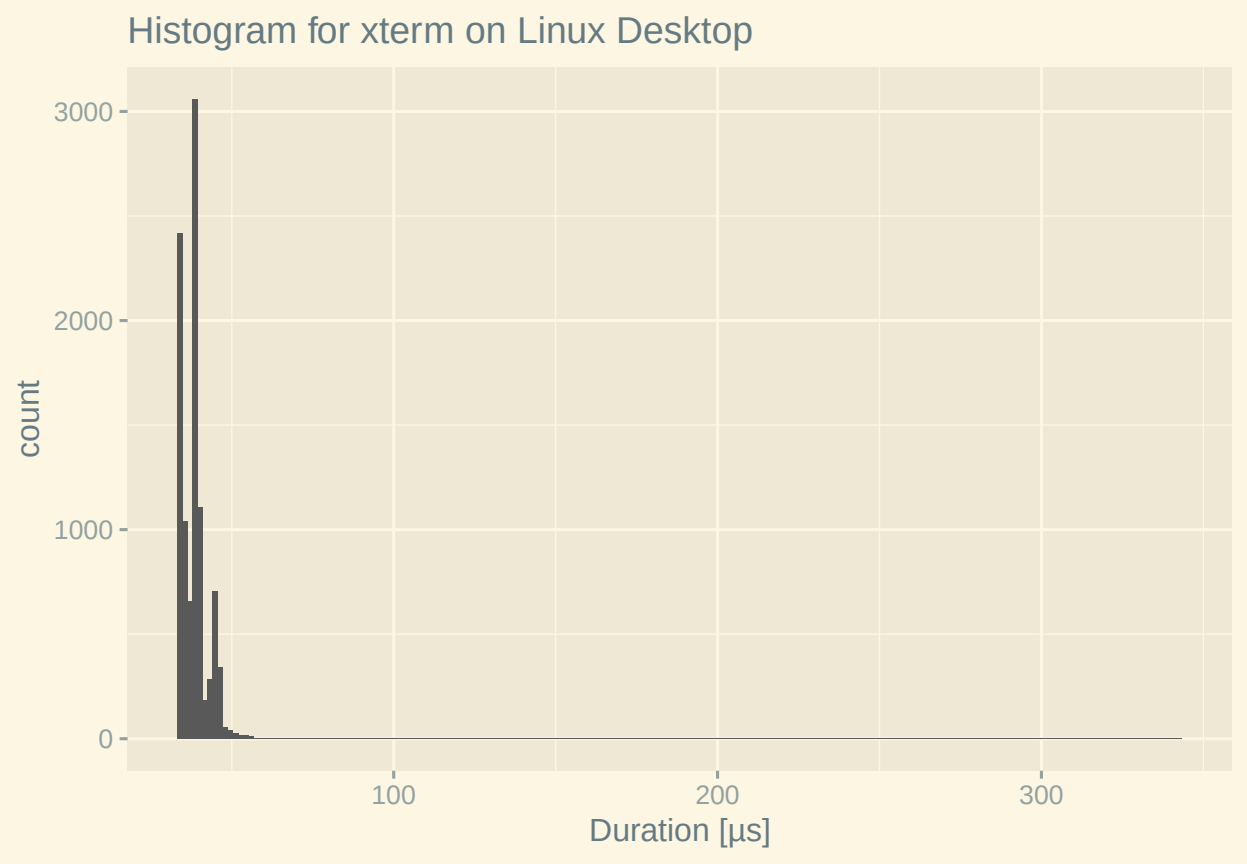

Violin plot for IntelliJ IDEA on MacBook Pro
Duration [µs]
20000
10000
0
IntelliJ IDEA
term

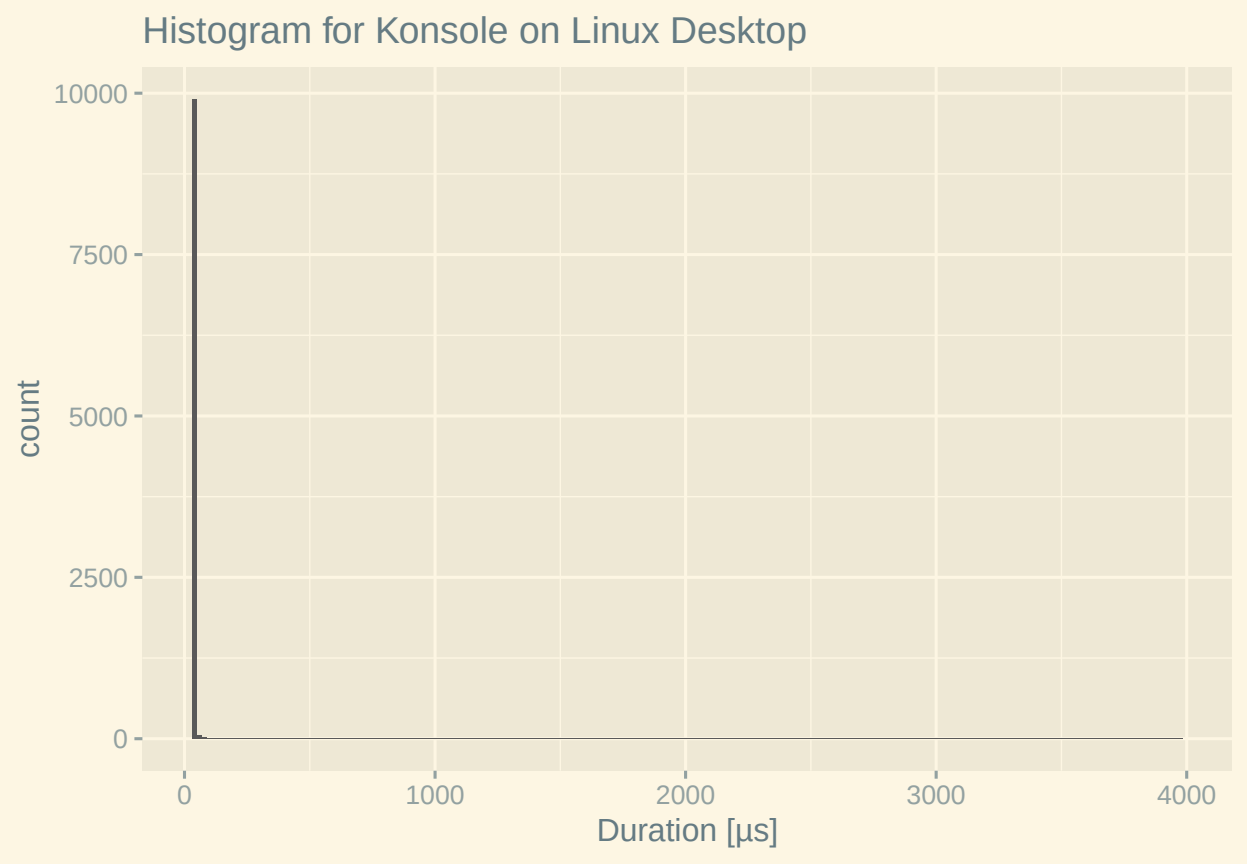


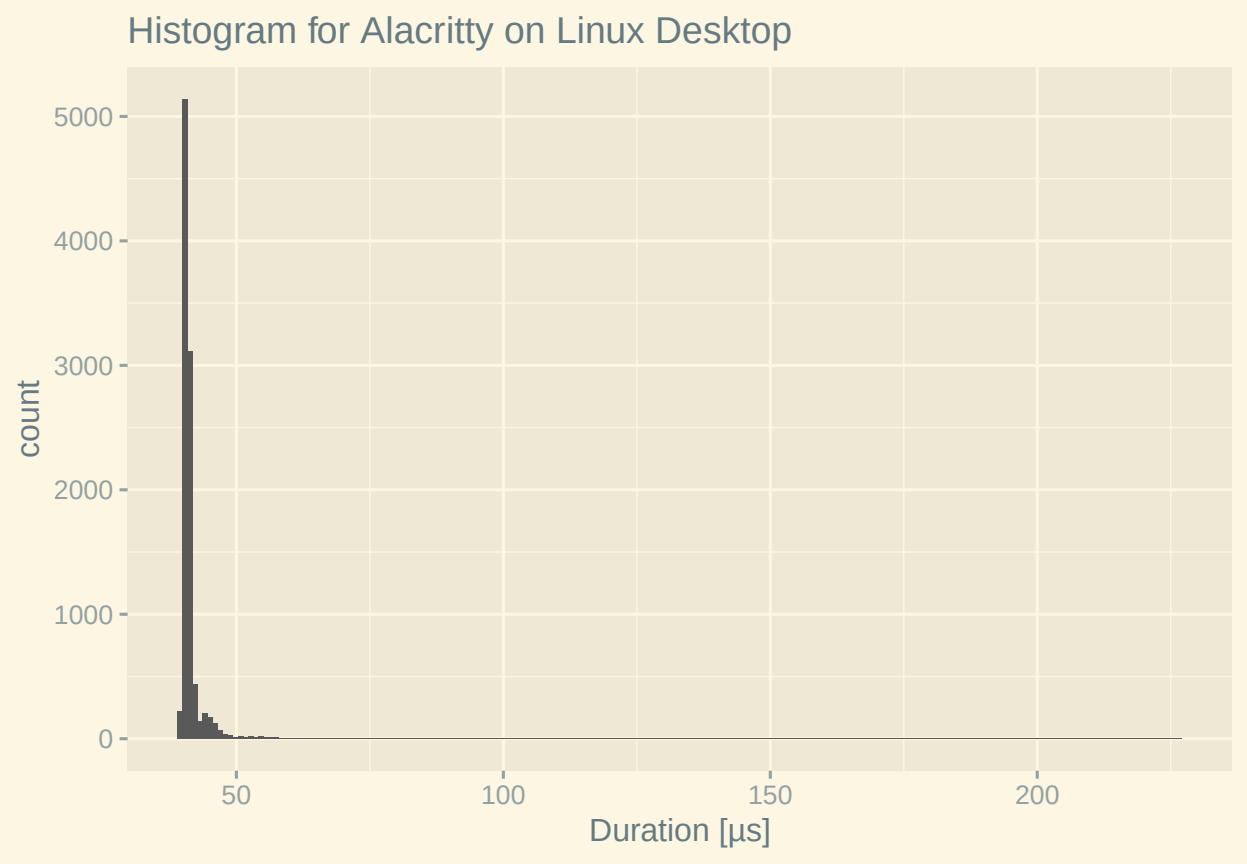
Histograms

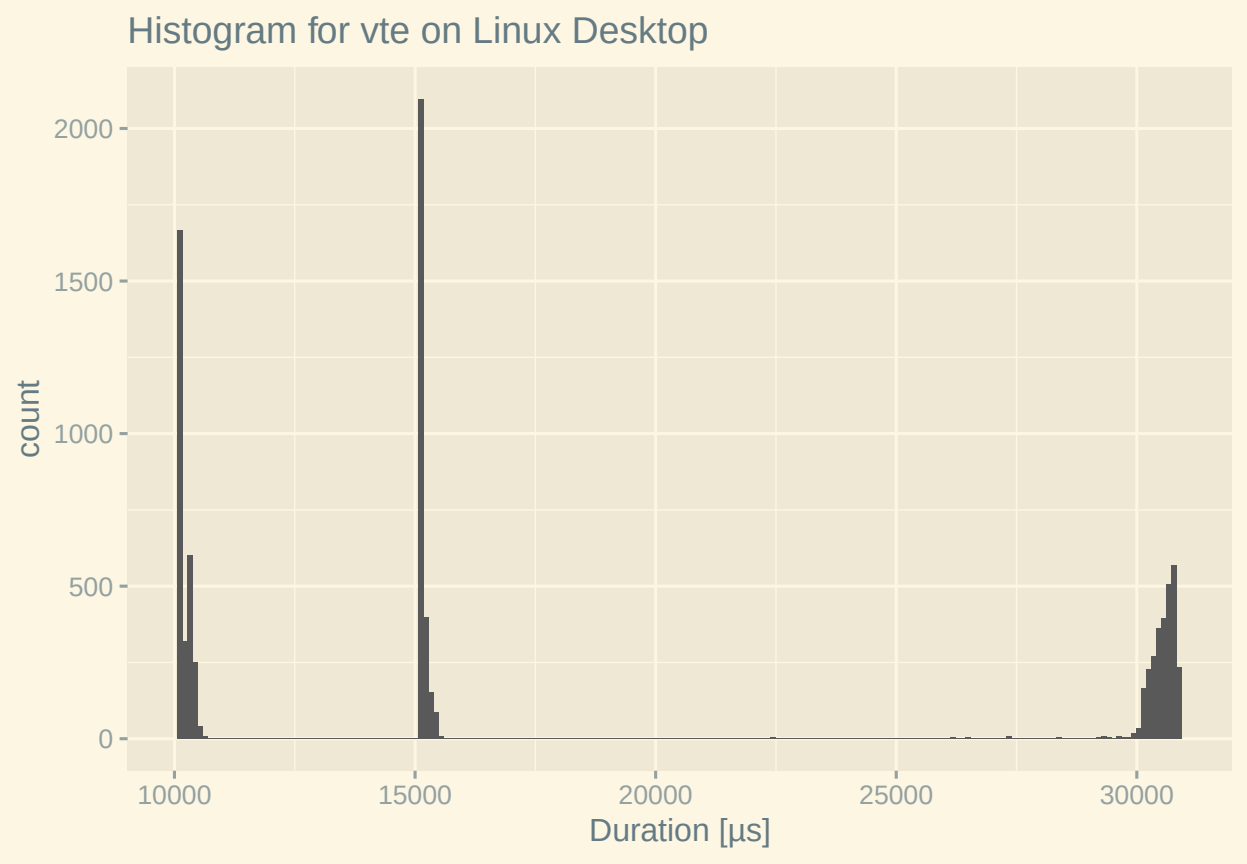
```
for (current_term in unique(dat$term)) {
  machine <- dat |>
    filter(term == current_term) |>
    pull(machine) |>
    unique();
  plt <- dat |>
    filter(term == current_term) |>
    ggplot(aes(x = duration_us)) +
    geom_histogram(bins = 200) +
    ggtitle(glue::glue("Histogram for {current_term} on {machine}")) +
    xlab("Duration [s]");
  print(plt);
}
```

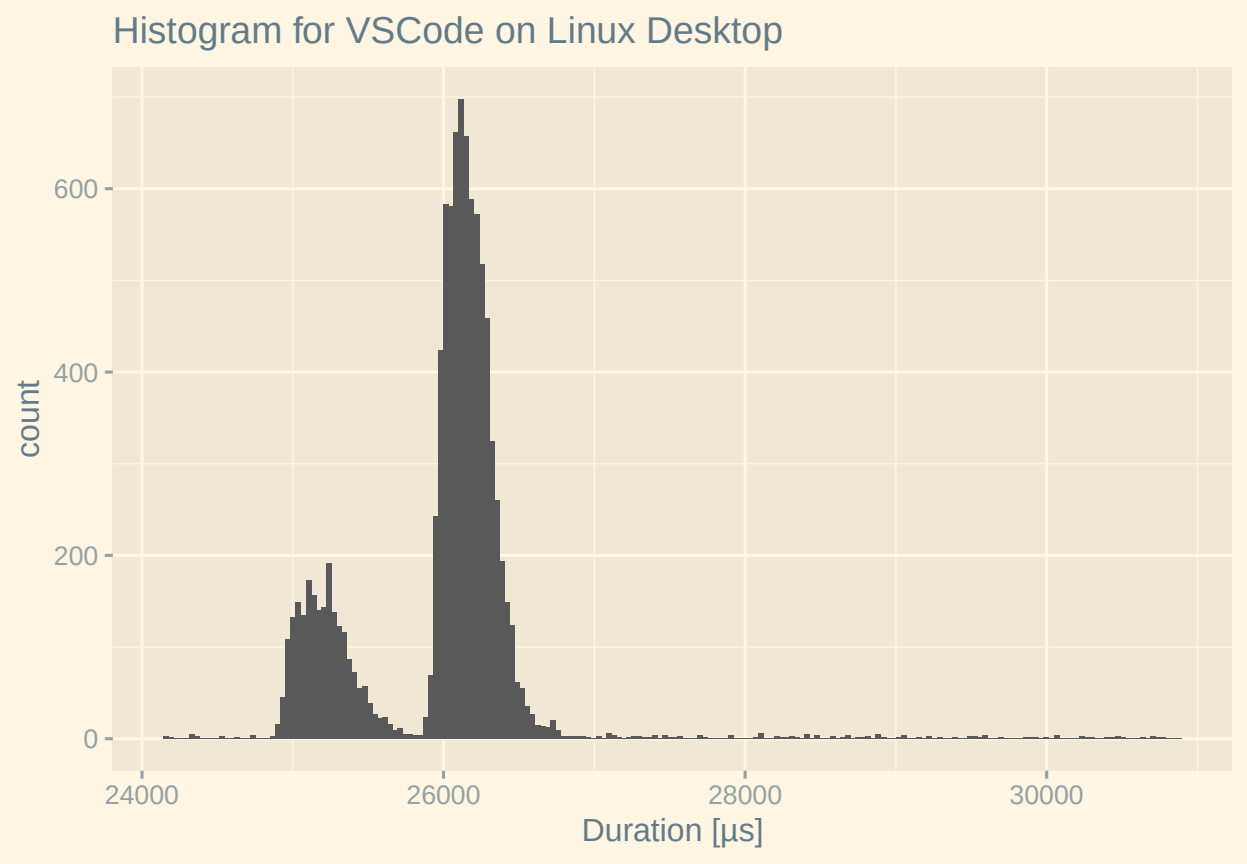

Histogram for foot on Linux Desktop
count
4000
3000
2000
1000
0
50
100
150
200
Duration [µs]

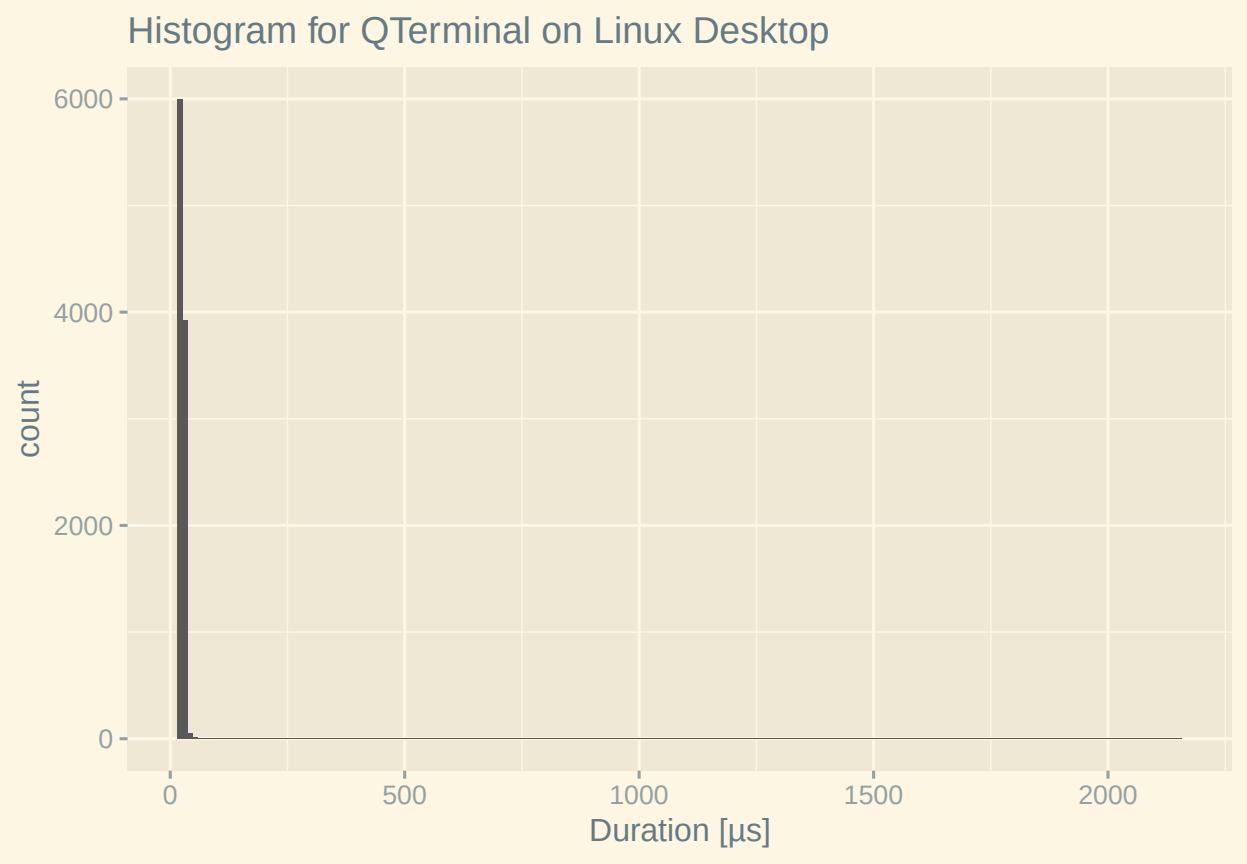

Histogram for xterm on Linux Desktop
3000
2000
1000
0
count
100
200
300
Duration [µs]

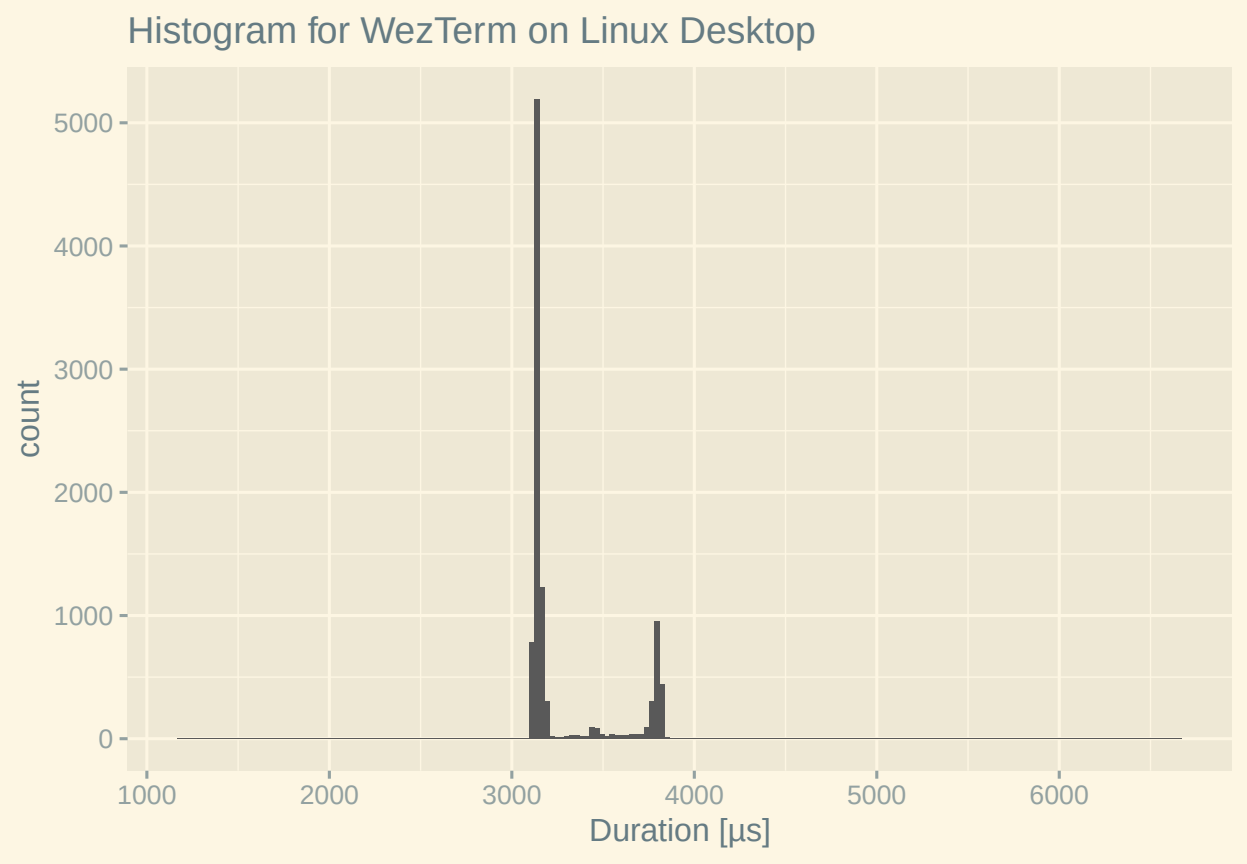

Histogram for Konsole on Linux Desktop
10000
7500
5000
2500
0
count
0
1000
2000
3000
4000
Duration [µs]

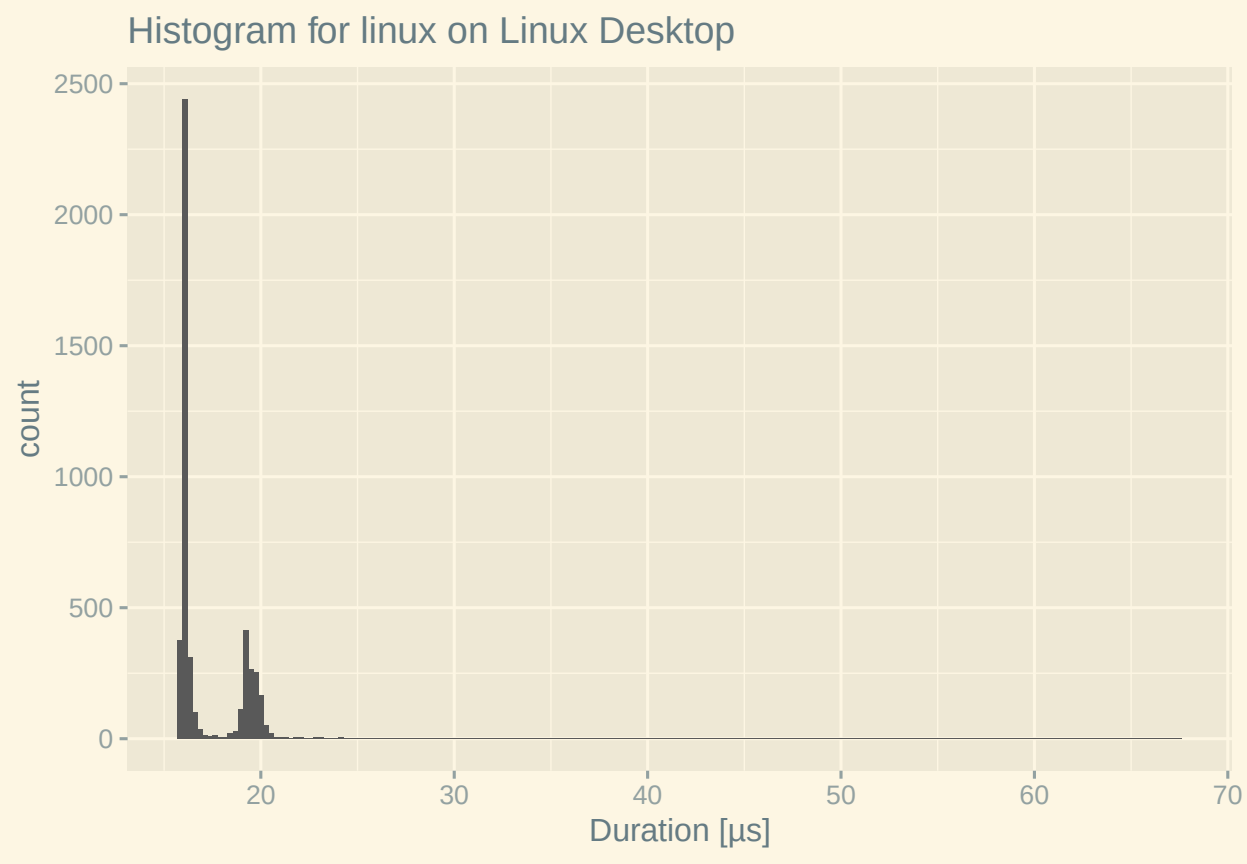

Histogram for Alacritty on Linux Desktop
count
5000
4000
3000
2000
1000
0
50
100
150
200
Duration [µs]

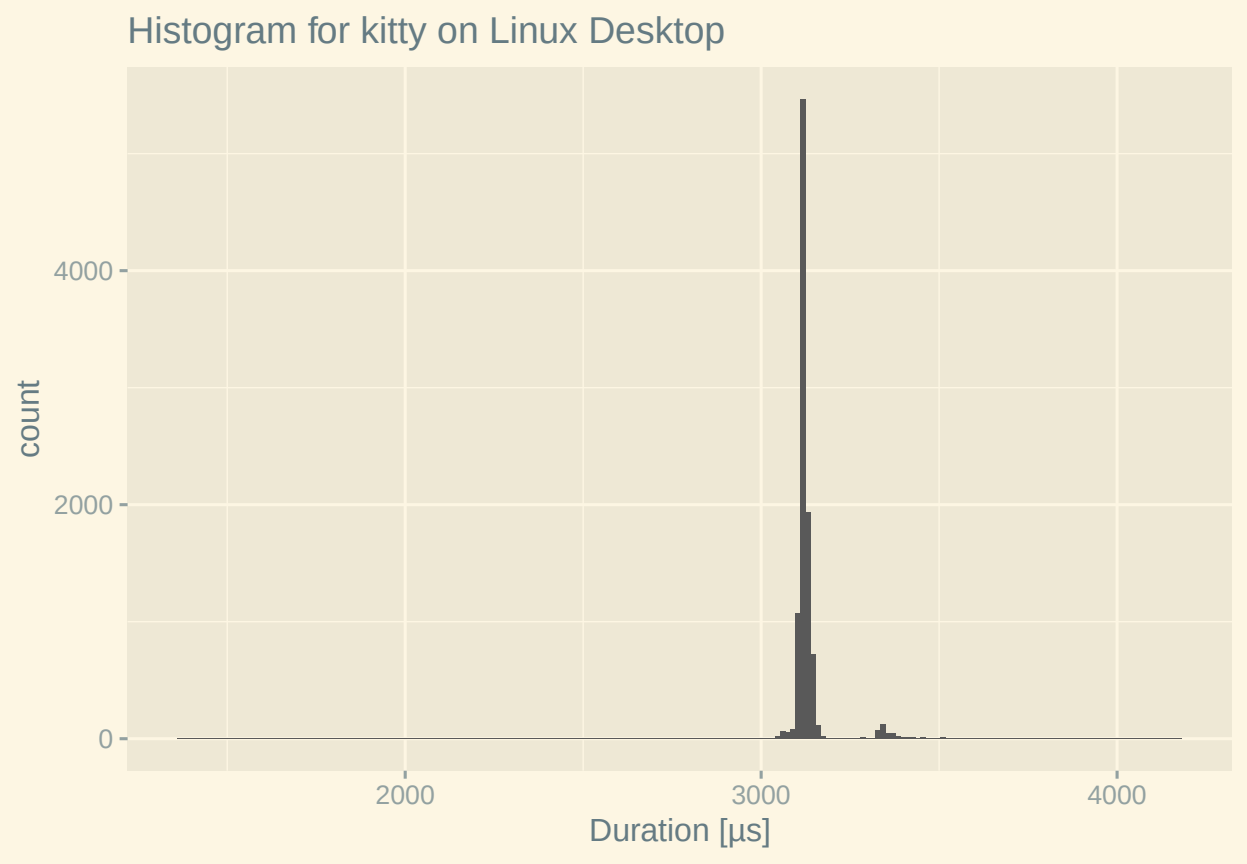

Histogram for vte on Linux Desktop
count
2000
1500
1000
500
0
10000
15000
20000
25000
30000
Duration [µs]

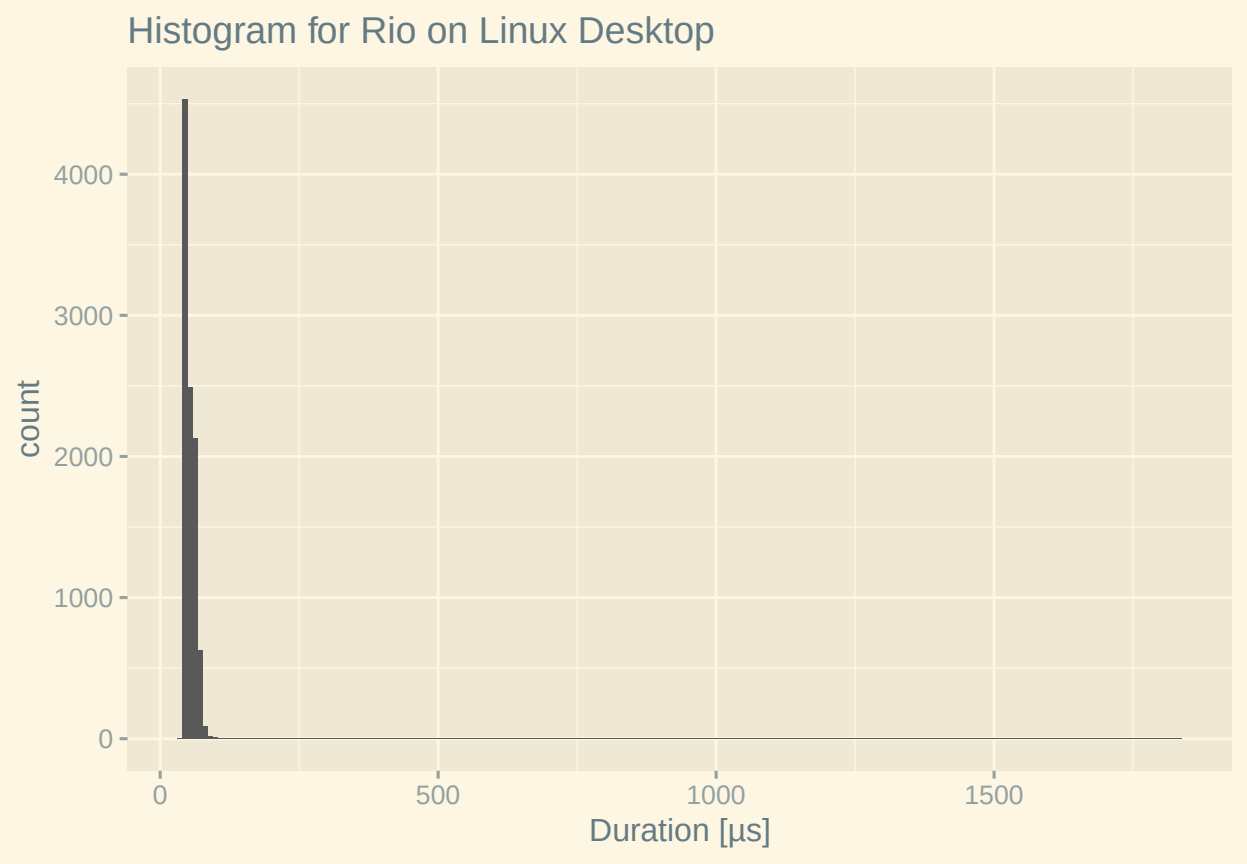

Histogram for VSCode on Linux Desktop
count
600
400
200
0
24000
26000
28000
30000
Duration [µs]

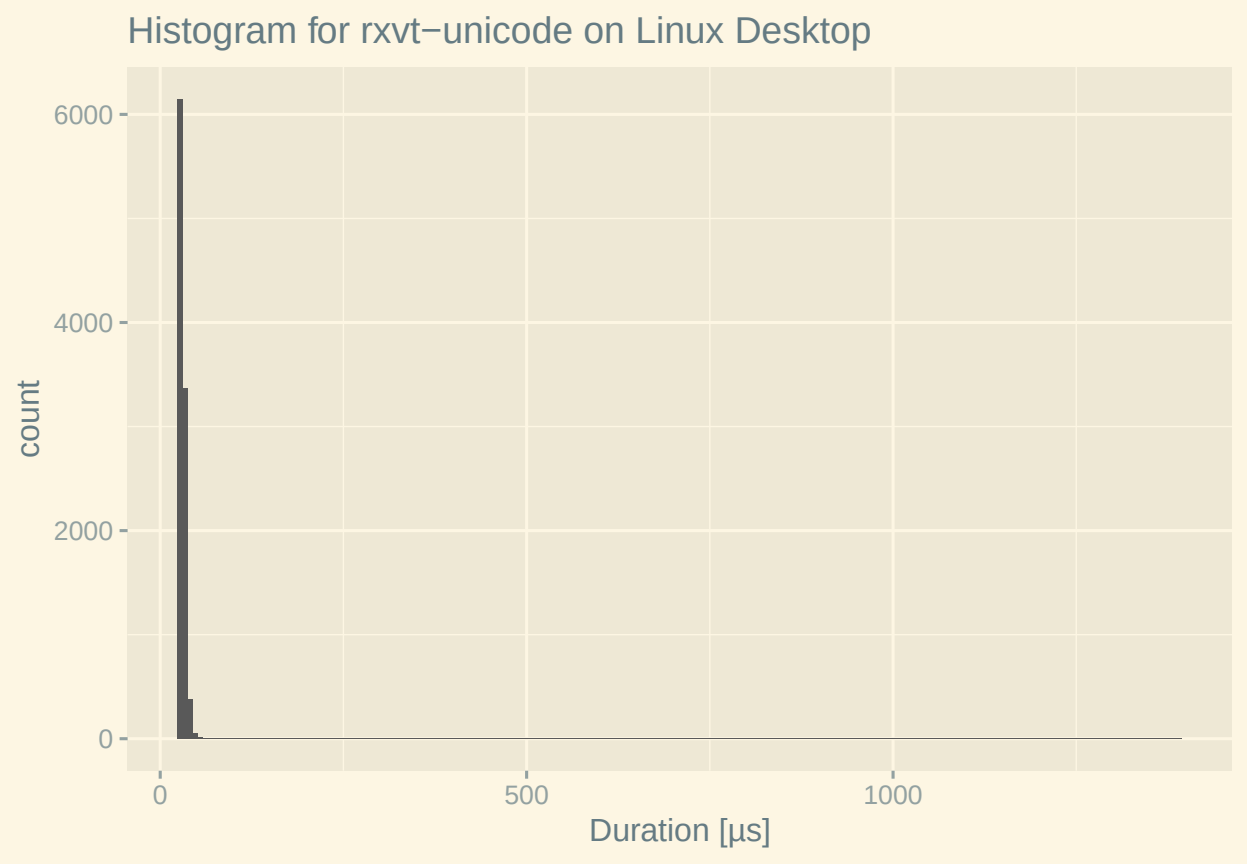

Histogram for QTerminal on Linux Desktop
6000
4000
2000
0
count
0
500
1000
1500
2000
Duration [µs]

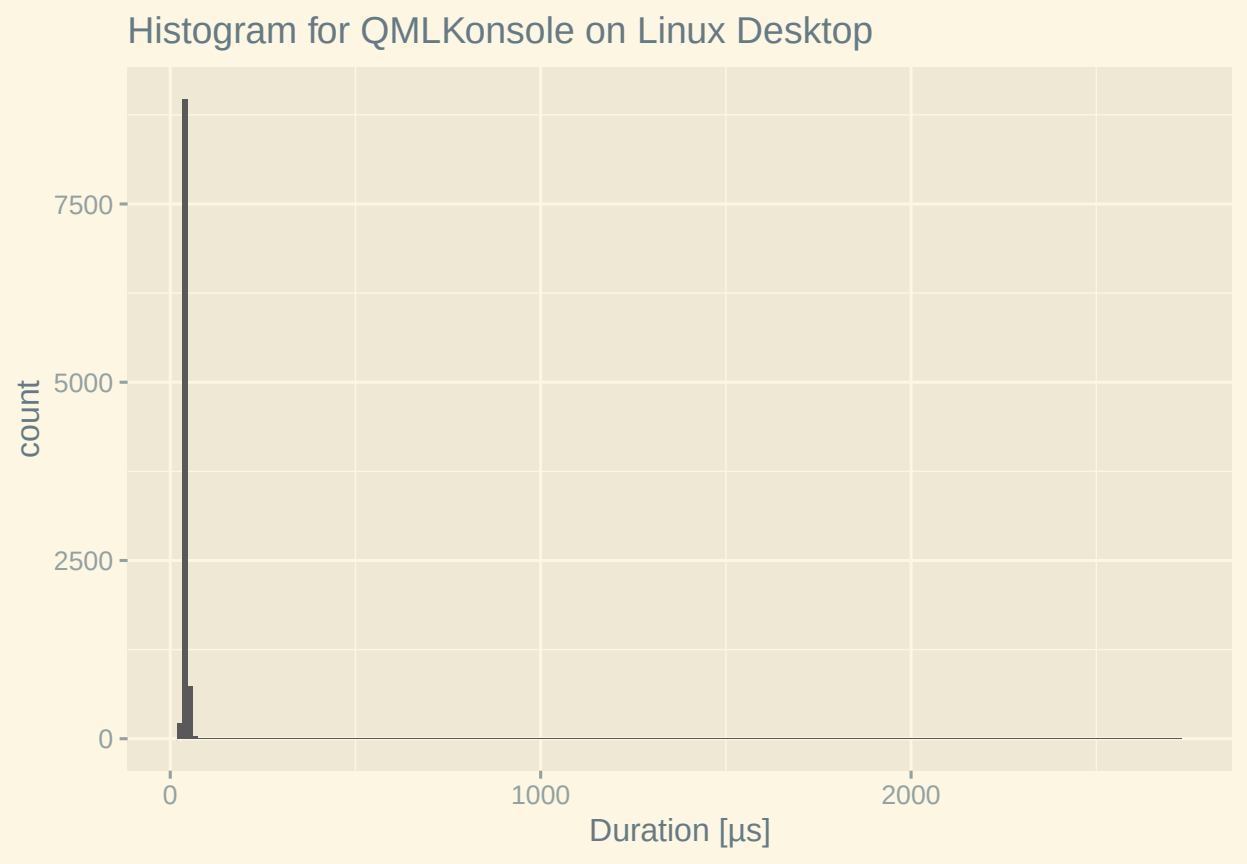

Histogram for WezTerm on Linux Desktop
count
5000
4000
3000
2000
1000
0
1000
2000
3000
4000
5000
6000
Duration [µs]

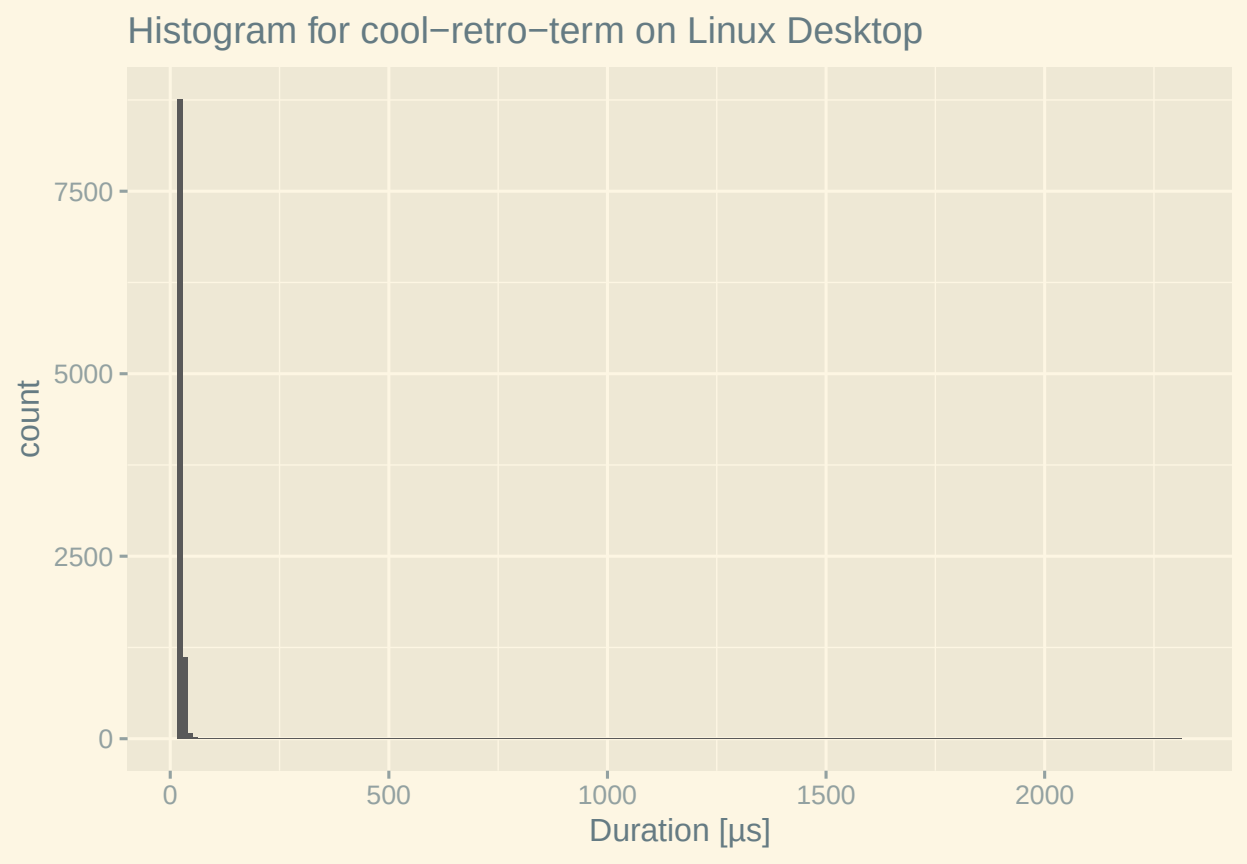

Histogram for linux on Linux Desktop
2500
2000
1500
1000
500
0
count
20
30
40
50
60
70
Duration [µs]

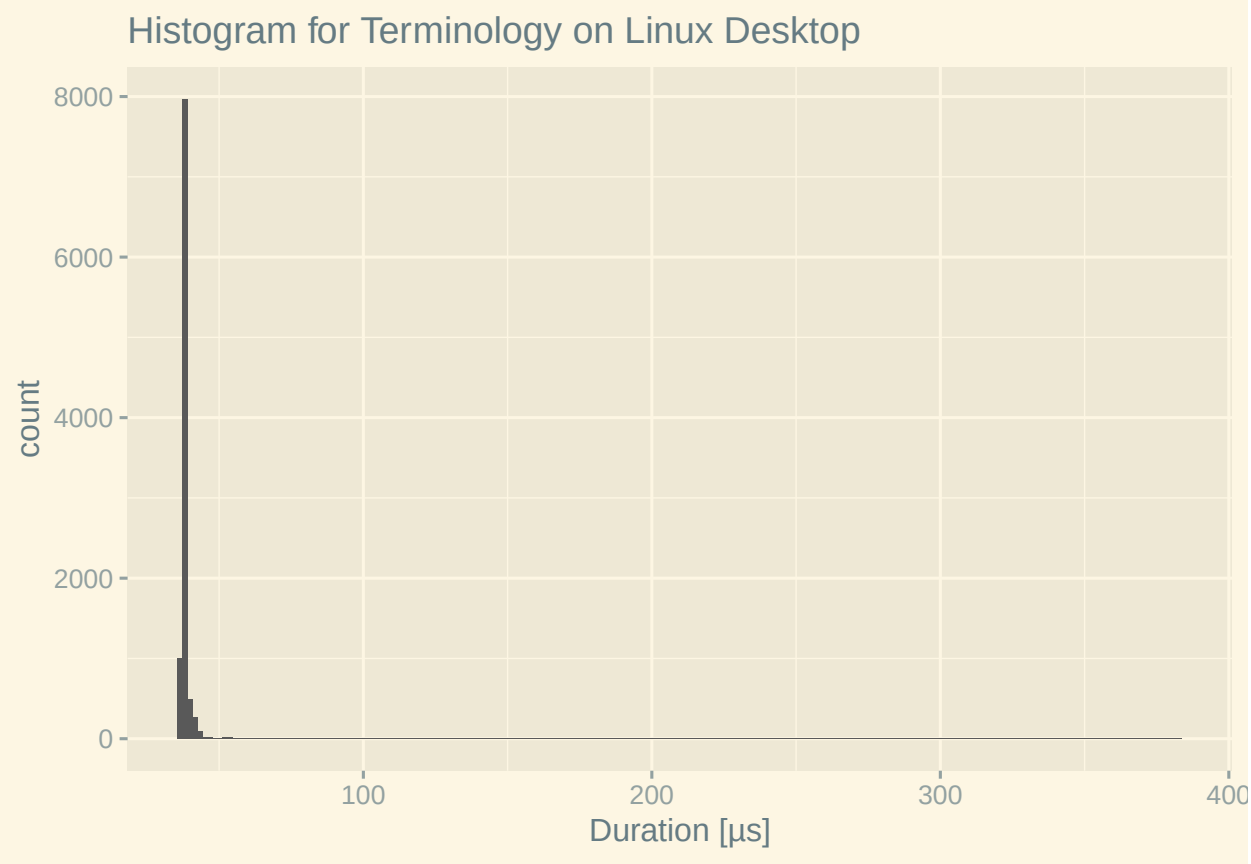

Histogram for kitty on Linux Desktop
count
4000
2000
0
2000
3000
4000
Duration [µs]

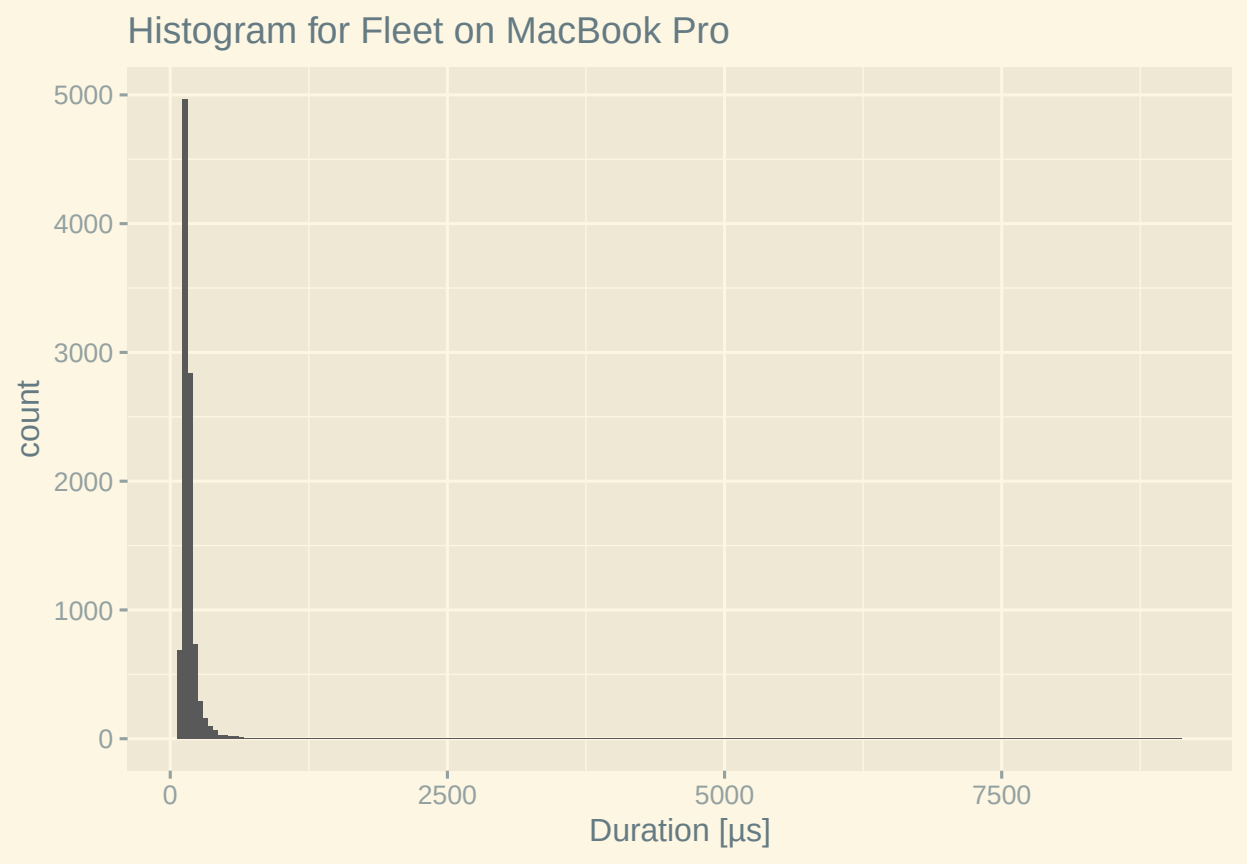

Histogram for Rio on Linux Desktop
count
4000
3000
2000
1000
0
0
500
1000
1500
Duration [µs]

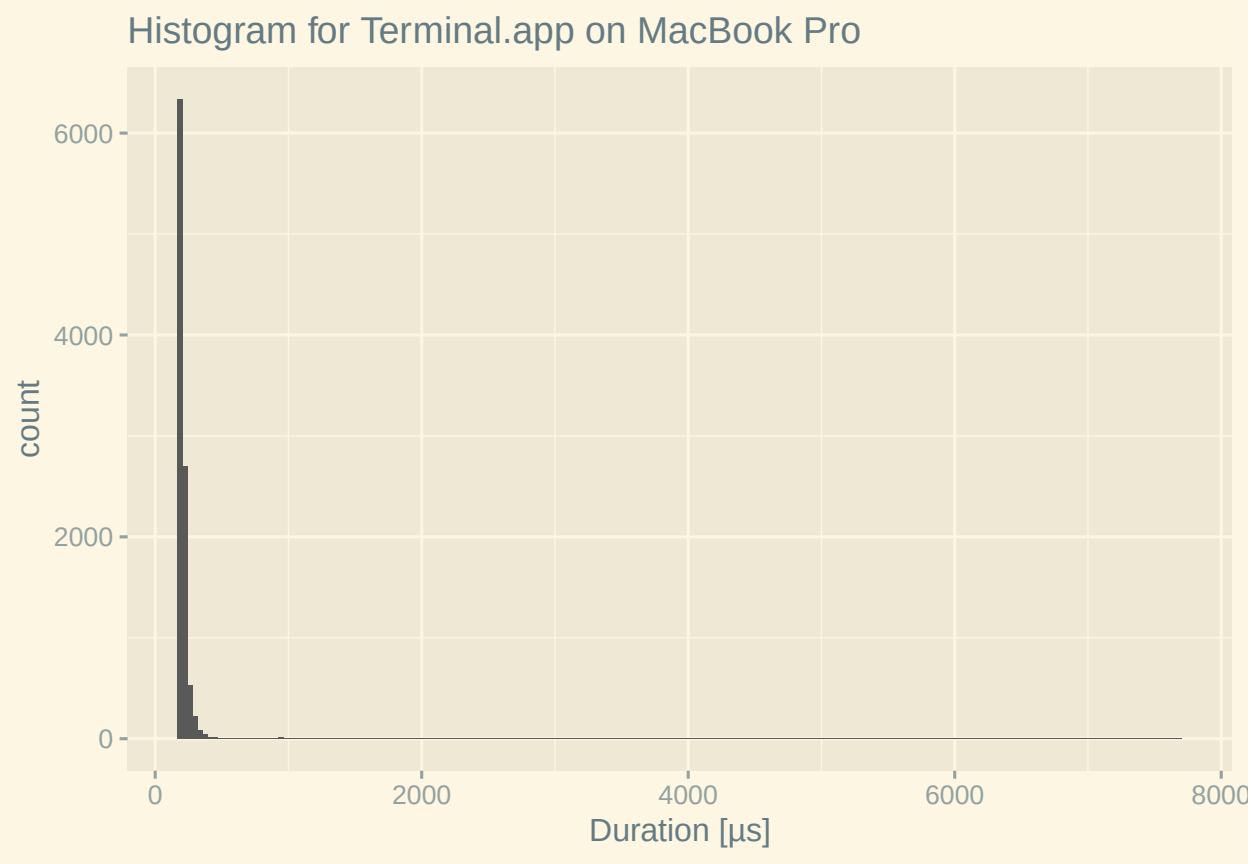

Histogram for rxvt−unicode on Linux Desktop
6000
4000
2000
0
count
0
500
1000
Duration [µs]

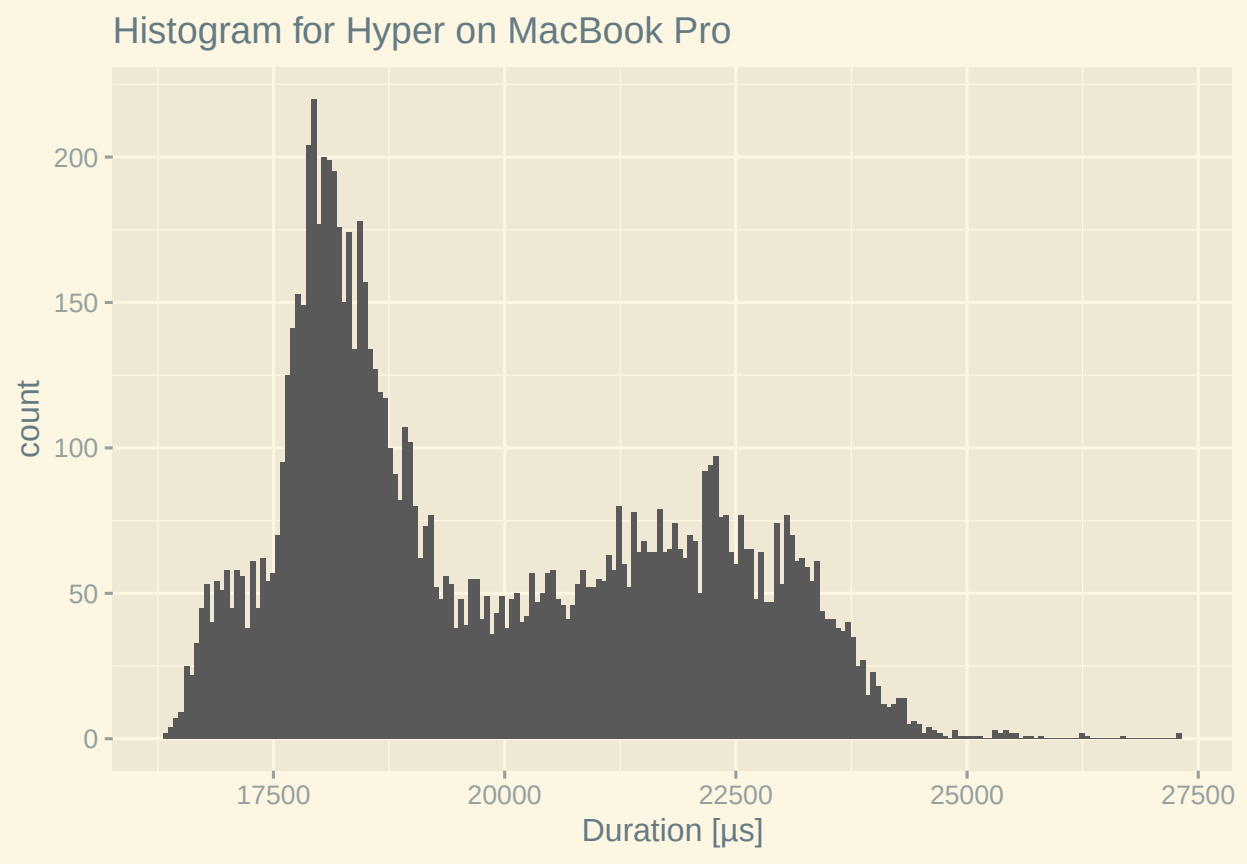

Histogram for QMLKonsole on Linux Desktop
count
7500
5000
2500
0
0
1000
2000
Duration [µs]

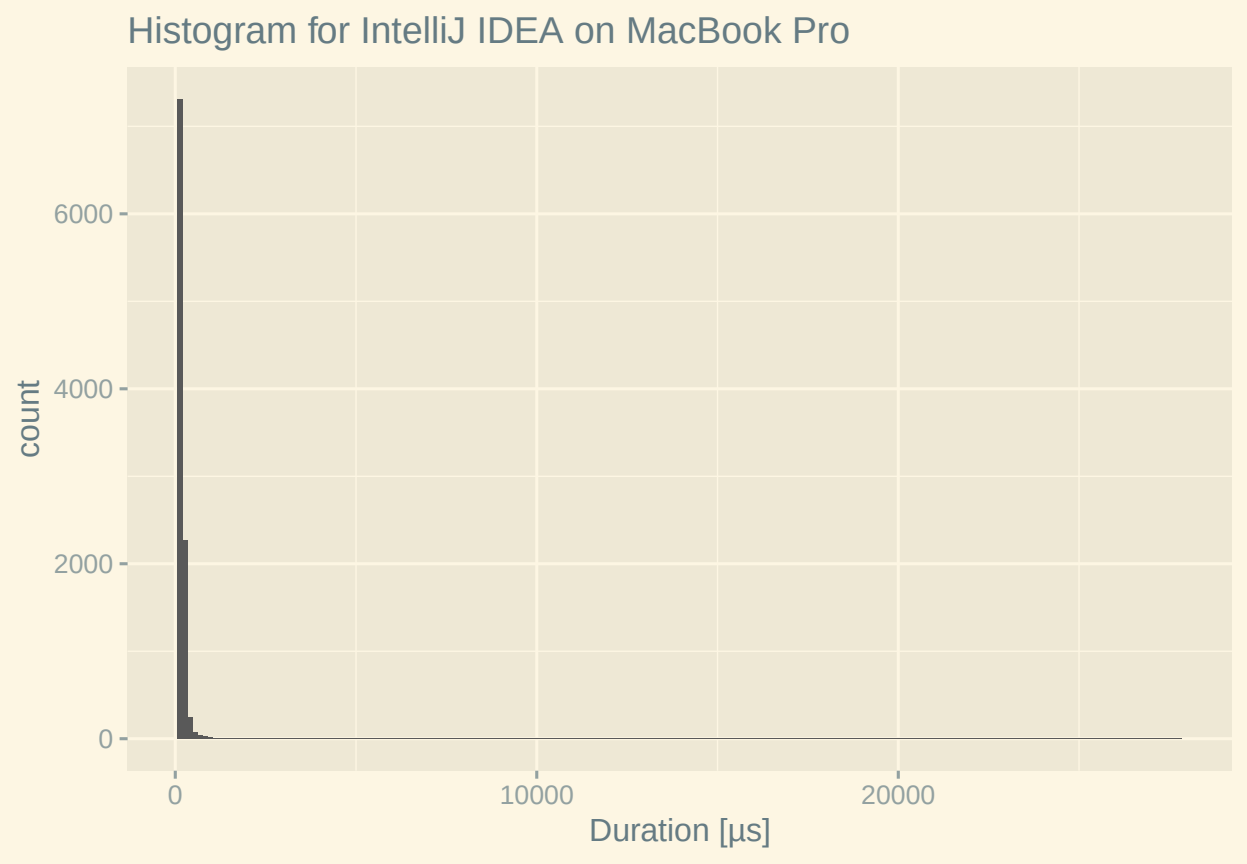

Histogram for cool−retro−term on Linux Desktop
count
7500
5000
2500
0
0
500
1000
1500
2000
Duration [µs]

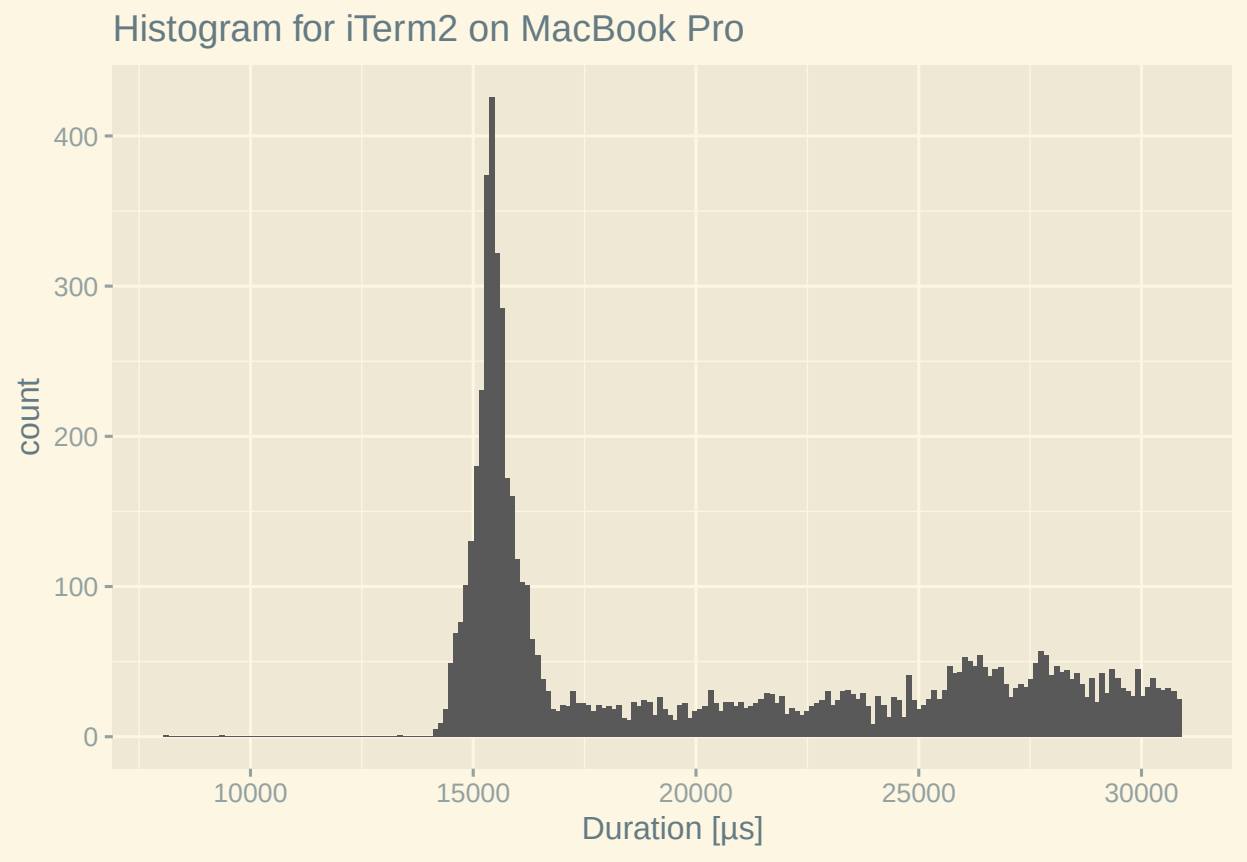

Histogram for Terminology on Linux Desktop
8000
6000
4000
2000
0
count
100
200
300
400
Duration [µs]


Histogram for Fleet on MacBook Pro
count
5000
4000
3000
2000
1000
0
0
2500
5000
7500
Duration [µs]


Histogram for Terminal.app on MacBook Pro
6000
4000
2000
0
count
0
2000
4000
6000
8000
Duration [µs]


Histogram for Hyper on MacBook Pro
count
200
150
100
50
0
17500
20000
22500
25000
27500
Duration [µs]

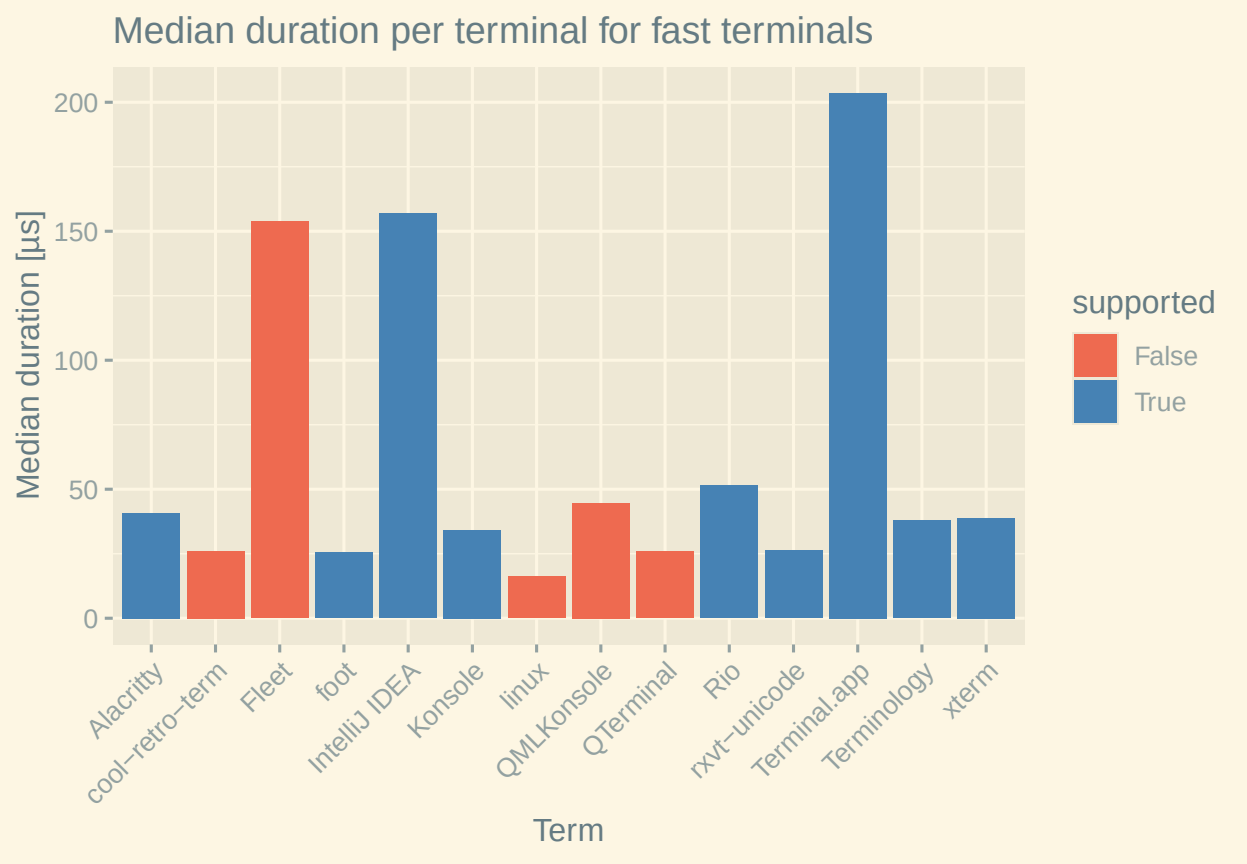

Histogram for IntelliJ IDEA on MacBook Pro
count
6000
4000
2000
0
0
10000
20000
Duration [µs]



Median plot

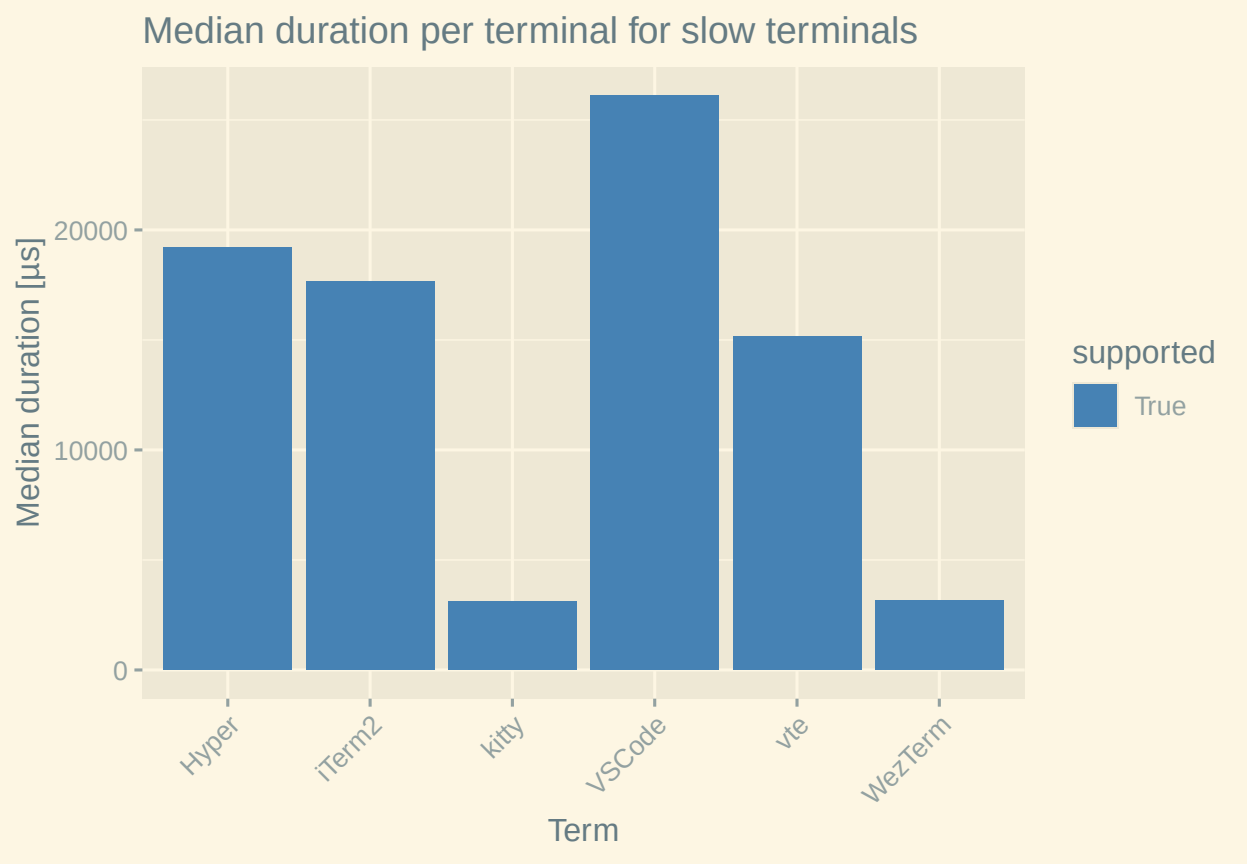
```
dat.median <- dat |>
  group_by(term, machine) |>
  summarise(
    median = median(duration_us),
    supported = ifelse(first(supported), "True", "False"),
    fast = median(duration_us) < 2000,
    .groups = "keep",
  );

dat.median |>
  filter(fast) |>
  ggplot(aes(x = term, y = median, fill = supported)) +
  geom_bar(stat = "identity", position = "dodge") +
  ggtitle("Median duration per terminal for fast terminals") +
  ylab("Median duration [s]") +
  xlab("Term") +
  scale_fill_manual(values = c(True = "steelblue", False = "coral2")) +
  theme(axis.text.x = element_text(angle = 45, hjust = 1));
```




```
ggsave("measurements_fast.svg", width = 10, height = 8)

dat.median |>
  filter(!fast) |>
  ggplot(aes(x = term, y = median, fill = supported)) +
  geom_bar(stat = "identity", position = "dodge") +
  ggtitle("Median duration per terminal for slow terminals") +
  ylab("Median duration [s]") +
  xlab("Term") +
  scale_fill_manual(values = c(True = "steelblue", False = "coral2")) +
  theme(axis.text.x = element_text(angle = 45, hjust = 1));
```




```
ggsave("measurements_slow.svg", width = 10, height = 8)
```